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JUL 16 1964

CURRENT SERIAL RECORDS

**WATER SUPPLY OUTLOOK**  
and  
**FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS**  
for  
**WASHINGTON**

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE,  
and  
DEPARTMENT of CONSERVATION STATE of WASHINGTON

Data included in this report were obtained by the agencies named above in cooperation with the U.S. Forest Service, U.S. Geological Survey, National Park Service, and other Federal, State and private organizations.

AS OF  
**APR. 1, 1964**

# UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

## To Recipients of Water Supply Outlook Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from advance estimates of the streamflow.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, up to 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

Streamflow forecasts are obtained by a comparison of total or maximum snow accumulation, as measured by snow water equivalent, to the subsequent spring and summer or snowmelt season runoff over a period of years. The snow water equivalent measured in selected snow courses provides most of the index to the streamflow forecast for the following season. More accurate forecasts are usually obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast procedure. Early season forecasts assume average climatic conditions through the snowmelt season.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions. Soil Conservation Service Reports may be secured from Water Supply Forecasting Unit, Soil Conservation Service, P.O. Box 2807, Portland, Oregon 97208.

## PUBLISHED BY SOIL CONSERVATION SERVICE

<u>REPORTS</u>	<u>ISSUED</u>	<u>LOCATION</u>	<u>COOPERATING WITH</u>
<b>RIVER BASINS</b>			
WESTERN UNITED STATES _____	MONTHLY (FEB.-MAY) _____	PORTLAND, OREGON _____	ALL COOPERATORS
BASIC DATA SUMMARY _____	OCTOBER 1 _____	PORTLAND, OREGON _____	ALL COOPERATORS
<b>STATES</b>			
ALASKA _____	MONTHLY (MAR.-MAY) _____	PALMER, ALASKA _____	ALASKA S.C.D.
ARIZONA _____	SEMI-MONTHLY _____ (JAN.15 - APR.1)	PHOENIX, ARIZONA _____	SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO _____	MONTHLY (FEB.-MAY) _____	FORT COLLINS, COLORADO _____	COLO. STATE UNIVERSITY COLO. STATE ENGINEER N. MEX. STATE ENGINEER
IDAHO _____	MONTHLY (JAN.-JUNE) _____	BOISE, IDAHO _____	IDAHO STATE RECLAMATION ENGINEER
MONTANA _____	MONTHLY (JAN.-JUNE) _____	BOZEMAN, MONTANA _____	MONT. AGR. EXP. STATION
NEVADA _____	MONTHLY (JAN.-MAY) _____	RENO, NEVADA _____	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES - DIVISION OF WATER RESOURCES
OREGON _____	MONTHLY (JAN.-JUNE) _____	PORTLAND, OREGON _____	OREG. STATE UNIVERSITY OREGON STATE ENGINEER
UTAH _____	MONTHLY (JAN.-JUNE) _____	SALT LAKE CITY, UTAH _____	UTAH STATE ENGINEER
WASHINGTON _____	MONTHLY (FEB.-JUNE) _____	SPOKANE, WASHINGTON _____	WN. STATE DEPT. OF CONSERVATION
WYOMING _____	MONTHLY (FEB.-JUNE) _____	CASPER, WYOMING _____	WYOMING STATE ENGINEER

## PUBLISHED BY OTHER AGENCIES

<u>REPORTS</u>	<u>ISSUED</u>	<u>AGENCY</u>
BRITISH COLUMBIA _____	MONTHLY (FEB.-JUNE) _____	WATER RESOURCES SERVICE, DEPT. OF LANDS, FOREST AND WATER RESOURCES, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA _____	MONTHLY (FEB.-MAY) _____	CALIF. DEPT. OF WATER RESOURCES, P.O. BOX 388, SACRAMENTO, CALIF.

FEDERAL-STATE-COOPERATIVE  
SNOW SURVEY AND WATER SUPPLY FORECASTS  
For  
WASHINGTON

Report Prepared  
By  
Robert T. Davis, Snow Survey Supervisor

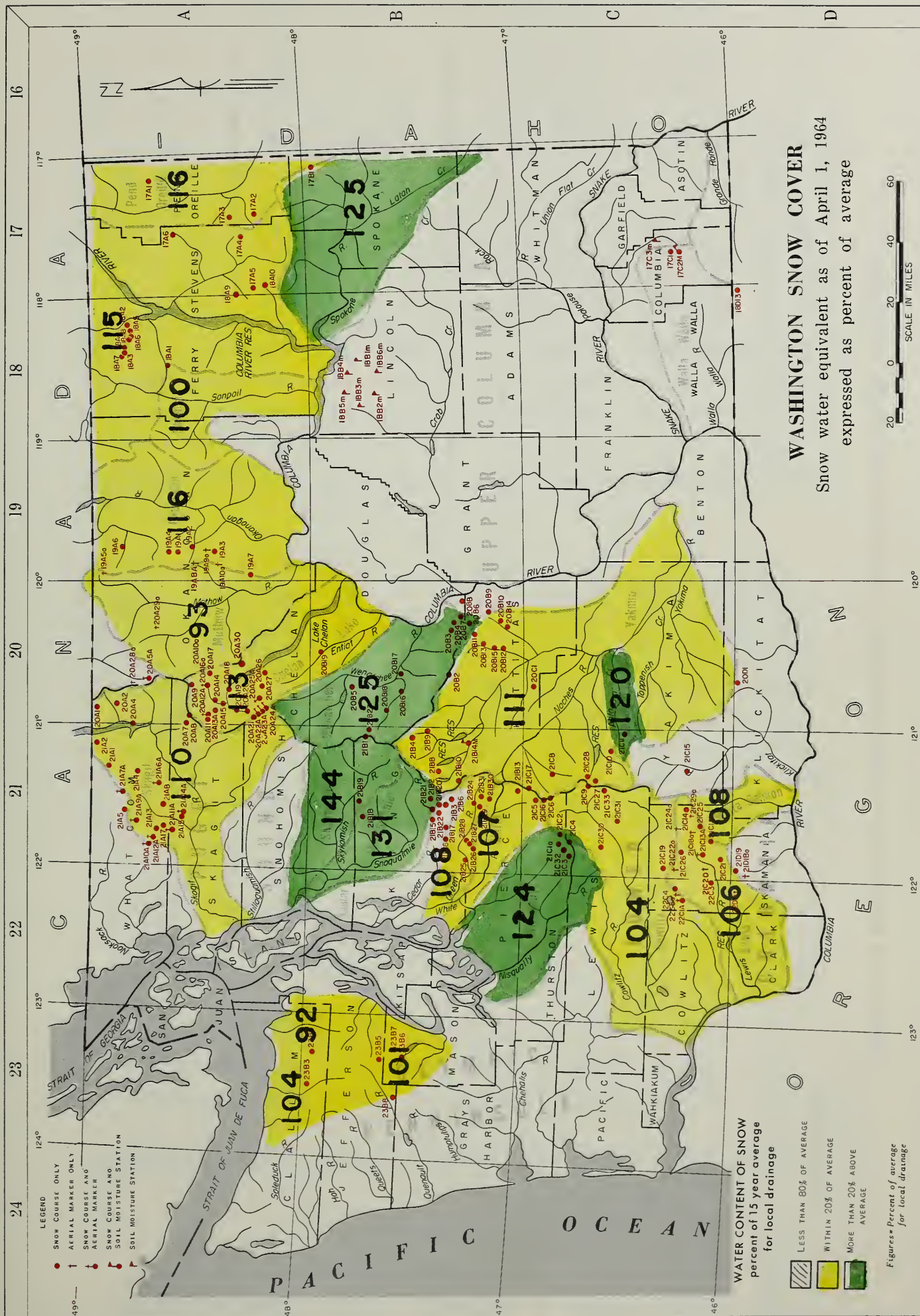
Soil Conservation Service  
840 Bon Marche Building  
Spokane, Washington

Issued By

Orlo W. Krauter  
State Conservationist  
Soil Conservation Service  
U. S. Department of Agriculture

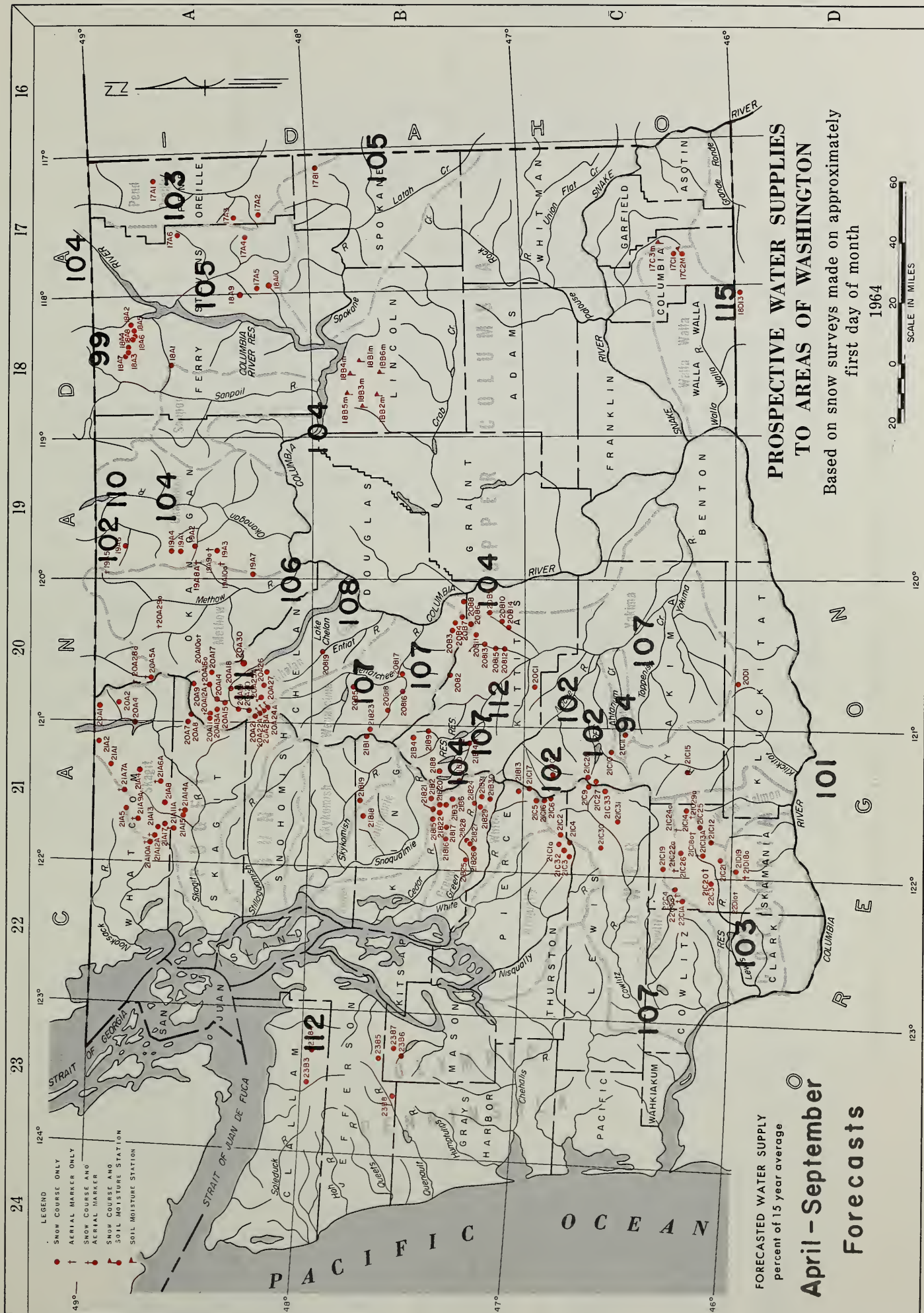
Murray G. Walker, Supervisor  
Division of Water Resources  
Department of Conservation  
State of Washington





# INDEX to WASHINGTON SNOW COURSES and SOIL MOISTURE STATIONS

UPPER COLUMBIA DRAINAGE				LOWER COLUMBIA DRAINAGE				PUGET SOUND DRAINAGE				OLYMPIC PENINSULA				
NAME	NUMBER	SEC. TWP. RANGE	ELEV.	NAME	NUMBER	SEC. TWP. RANGE	ELEV.	NAME	NUMBER	SEC. TWP. RANGE	ELEV.	NAME	NUMBER	SEC. TWP. RANGE	ELEV.	
Pend Oreille River				Wenatchee River				Lewis River				Snoqualmie River				
Boyer Mountain	17A2	7	31N 43E	5250	Berne-Mill Creek	21B23	7	26N 15E	2925	Blue Lake	21C22a	19	9N	8E	4809	
Bunchgras Meadow	17A1	24	37N 44E	5000	Slawett Pass No. 2	20B2	35	22N 17E	4270	Bob'e Trail	21C21	25	8N	7E	2200	
Mt. Spokane	17B1	15	28N 45E	4650	Chiwaukum G. S.	20B16	4	25N 17E	1810	Calamity Ridge	22D1a	8	5N	5E	2500	
Winchester Creek	17A3	30	33N 43E	2970	Lake Wenatchee	20B5	33	27N 17E	1970	Council Pass	21C18a	24	9N	9E	4200	
					Leavenworth R. S.	20B17	1	24N 17E	1127	Divide Meadow	21C29a	21	8N	10E	5600	
					Nevitt Pass	20B18	4	26N 16E	2140	Grand Meadow	21C25	28	8N	9E	3500	
					Saverts Pass	21B1	14	26N 13E	4070	Jono Fine Shelter	21C26	8	9N	7E	3800	
Kettle River				Squallchuck Creek				Cowliitz River				Baker River				
Boulder Road	18A2	36	39N 36E	4470						Marble Mountain	22C5a	24	8N	5E	3200	
Butte Creek	18A3	28	39N 35E	4050						Muddy River	22C3	26	8N	6E	3400	
Cabin Creek	18A8	5	38N 36E	3170	Beehive Springs	20B3	12	21N 19E	4400	Oldman Pass	21D19	22	6N	7E	3100	
Gout Creek	18A4	26	39N 35E	3595	Scout-A-Vista	20B4	18	21N 20E	3400	Plaine of Abraham	22C1a	35	9N	5E	4200	
Snow Caps Creek	18A5	3	38N 36E	2150						Smith Creek Road	22C4	29	9N	6E	2100	
Snow Caps Trail	18A6	5	38N 36E	2720	Stiemilt Creek	20B3	34	21N 20E	4450	Spencer Meadow	21C20a	16	8N	7E	3400	
Summit G. S.	18A7	20	39N 35E	4600	Jump-Off	20B6	30	21N 20E	5000	Surprise Lakes	21C13A	14	7N	8E	4250	
					Senilt Slide	20B7	30	21N 20E	4400	Table Mountain	21C24a	20	9N	9E	4200	
					Upper Wheeler					Timbered Peak	21D18a	36	6N	6E	3000	
Colville River				Crob Creek				Nisqually River				Nooksack River				
Balrd	17A6	19	36N 42E	3215						Gayuse Pass	21C6	15	16N	10E	5300	
Balrd	18A9	34	32N 38E	2885	Creation-Kunz	18B1m	32	27N 34E	2440	Mosquito Meadows	21C19	33	10N	7E	4100	
Cnewelah	17A4	11	32N 41E	4925	Govan	18B2m	20	26N 32E	2050	Okanapocoh	21C32	28	15N	10E	2870	
Stranger Mountain	17A5	26	31N 38E	4990	Jack Woods	18B3m	28	27N 31E	2750	Pachwood Lake	21C31	21	13N	10E	2820	
Togo	18A10	6	29N 38E	3370	Krause	18B4m	21	27N 33E	2420	Pigtail Peak	21C33	11	14N	11E	5900	
					Sheffels	18B5m	17	27N 32E	2378	Potato Hill	21C14	36	10N	10E	4500	
					Wheatridge	18B6m	24	25N 32E	2290	William Creek	21C30	3	13N	8E	3250	
Sanpoil River				Yokima River				White River				Dungeness River				
Sherman Creek Pass	18A1	19	36N 35E	5350						Ghost Forest	21C4	23	15N	8E	4550	
					Ahtanum R. S.	21C11	26	12N 14E	3100	Longmire	21C3	29	15N	8E	2760	
					Big Boulder Creek	21B9	35	23N 14E	3200	Paradise Park	21C2	13	15N	8E	5500	
					Bumping Lake	21C8	23	16N 12E	3450	Stem Glade	21C1	13	15N	8E	5050	
					Clockum Pass	20B9	25	20N 20E	5370							
					Cooke Creek	20B10	17	19N 20E	4123	OLYMPIC PENINSULA						
					Fish Lake	21B4	34	24N 14E	3371	Dungeness River						
					Green Lake	21C10	3	12N 13E	6000	Deer Park	23B4	1	28N	5W	5200	
					Grouse Camp	20B11	29	21N 19E	5385							
					High Creek	20B12	34	20N 19E	2930	Elwha River	23B3	36	29N	7W	4500	
					Lake Cle Elum	21B14M	15	20N 14E	2200	Hurricane	23B8	25	24N	7W	3900	
					Manashtash	20C1	6	16N 11E	5400							
					Norse Lake	20C17	4	20N 19E	3875	Skokomish River						
					Nanum	20B13	4	20N 19E	3875	Black and White	23B7	17	24N	5W	4200	
					Trail Creek	20B14	20	19N 20E	3360	Black and White	23B6	16	24N	5W	4700	
					Tunnel Avenue	20B15	13	21N 11E	2450	Home Sweet Home	23B5	28	25N	5W	5200	
					Walters Flat	20B15	22	20N 19E	3360	Sundown Pass	23B8	25	24N	7W	3900	
					White Pass	21C9	2	13N 11E	4500							
					White Pass (East Side)	21C28	2	13N 11E	4500							
					White Pass (Leach Lake)	21C27	1	13N 11E	4500							
Chellon Lake Basin				LOWER COLUMBIA DRAINAGE				PUGET SOUND DRAINAGE				OLYMPIC PENINSULA				
Agnas Creek	20A21	1	31N 15E	5400												
8-ridge Creek	20A15	20	34N 16E	2100												
Bullion	20A18	2	33N 16E	1460												
Cloudy Pass	20A22A	12	31N 15E	6500												
Cottonwood	20A11	10	34N 14E	2500												
Dagger Lake	20A17	6	34N 18E	5200												
Greenwood Flat	20A25A	3	31N 16E	3540												
Little Meadows	20A24A	8	31N 16E	5275												
Lynn Lake	20A23A	18	31N 16E	5900												
Park Creek Flat	20A13A	18	34N 16E	2220												
Park Creek Ridge	20A12A	7	34N 16E	4600												
Pass Creek	20A19	30	33N 16E	2500												
Petersons	20A16a	3	34N 17E	3730												
Rainy Pass	20A9	21	35N 17E	4780												
Safety Harbor	20A30	32	35N 20E	6000												
Seven Mile	20A26	14	31N 17E	3015												
Two Mile	20A27	16	31N 18E	2020												
Entiat River				White Salmon River				Cedar River				Skokomish River				
	20B19	34	28N 19E	1600												



# INDEX to WASHINGTON SNOW COURSES and SOIL MOISTURE STATIONS

NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.
<b>UPPER COLUMBIA DRAINAGE</b>					
<b>Pend Oreille River</b>					
Boyer Mountain	17A2	7	31N	43E	5250
Bunchgrass Meadow	17A1	24	37N	44E	5000
Mt. Spokane	17B1	15	28N	45E	4650
Winchester Creek	17A3	30	33N	43E	2970
<b>Kettle River</b>					
Boulder Road	18A2	36	39N	36E	1450
Butte Creek	18A3	28	39N	35E	4070
Cabin Creek	18A8	5	38N	36E	3170
Goat Creek	18A4	26	39N	35E	3595
Snow Caps Creek	18A5	3	38N	36E	2150
Snow Caps Trail	18A6	5	38N	36E	2720
Summit C. S.	18A7	20	39N	35E	4600
<b>Colville River</b>					
Baird	17A6	19	36N	42E	3215
Carlson	18A9	34	32N	38E	2885
Chavaliah	17A4	11	32N	41E	4925
Stranger Mountain	17A5	26	31N	38E	4990
Togo	18A10	6	29N	38E	3370
<b>Sanpoil River</b>					
Sherman Creek Pass	18A1	19	36N	35E	5350
<b>Okanogan River</b>					
Clark	19A8A	2	36N	23E	7000
Muckamuck	19A9A	20	36N	24E	6750
Mutton Creek No. 1	19A1	30	37N	24E	5700
Mutton Creek No. 2	19A2	19	37N	24E	6000
Payson	20A28A	32	40N	18E	4300
Rusty Creek	19A3	38	35N	24E	4500
Salmon Meadows	19A2	33	37N	24E	4000
Starvation Mtn.	19A10A	15	35N	23E	6750
Touts Coulee	19A6	30	39N	25E	2845
<b>Methow River</b>					
Billy Goat Pass	20A10A	10	38N	20E	6400
Dollar Watch	20A29A	8	39N	20E	7000
Harts Pass	20A5A	7	37N	18E	6500
Horseshoe Basin	19A5A	15	40N	23E	7000
Loup Loup	19A7	36	34N	23E	4650
<b>Chelon Lake Basin</b>					
Agnes Creek	20A21	1	31N	15E	5400
Bridge Creek	20A15	20	34N	16E	2100
Bullion	20A18	2	33N	16E	1460
Cloudy Pass	20A22A	12	31N	15E	6500
Cottonwood	20A11	10	34N	14E	2500
Dagger Lake	20A17	6	34N	18E	5200
Greenwood Flat	20A25A	3	31N	16E	3540
Little Meadows	20A24A	8	31N	16E	5275
Lynan Lake	20A23A	18	31N	16E	5900
Park Creek Flat	20A13A	18	34N	16E	2220
Park Creek Ridge	20A12A	7	34N	16E	4600
Park Creek	20A19	30	33N	16E	2500
Petersons	20A16A	3	34N	17E	3730
Rainy Pass	20A9	21	35N	17E	4780
Safety Harbor	20A30	32	31N	20E	6000
Seven Mile	20A26	14	31N	17E	3015
Two Mile	20A27	16	31N	18E	2020
<b>Entiat River</b>					
Brief	20B19	34	28N	19E	1600

NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.
<b>Wenatchee River</b>					
Berne-Mill Creek	21B23	7	26N	15E	2925
Blewett Pass No. 2	20B2	35	22N	17E	4270
Chiwaukum C. S.	20B16	4	25N	17E	1810
Lake Wenatchee	20B5	33	27N	17E	1970
Leavenworth R. S.	20B17	1	24N	17E	1127
Merritt	20B18	4	26N	16E	2140
Stevens Pass	21B1	14	26N	13E	4070
<b>Squilchuck Creek</b>					
Beehive Springs	20B3	12	21N	19E	4400
Scout-A-Vista	20B4	18	21N	20E	3400
<b>Stemilt Creek</b>					
Jump-Off	20B8	34	21N	20E	4450
Stemilt Slide	20B6	30	21N	20E	5000
Upper Wheeler	20B7	30	21N	20E	4400
<b>Crab Creek</b>					
Creston-Kunz	18B1m	32	27N	34E	2440
Covan	18B2m	20	26N	32E	2050
Jack Woods	18B3m	28	27N	31E	2750
Krause	18B4m	21	27N	33E	2420
Sheffels	18B5m	17	27N	32E	2378
Wheatridge	18B6m	24	25N	32E	2290
<b>Yakima River</b>					
Ahtanum R. S.	21C11	26	12N	14E	3100
Big Boulder Creek	21B9	35	23N	14E	3200
Bumping Lake	21C8	23	16N	12E	3450
Clockum Pass	20B9	25	20N	20E	5770
Cooke Creek	20B10	17	19N	20E	4123
Fish Lake	21B4	34	24N	14E	3771
Green Lake	21C10	3	12N	13E	6000
Grouse Camp	20B11	29	21N	19E	5585
High Creek	20B12	34	20N	19E	2930
Lake Cle Elum	21B14M	15	20N	14E	2200
Manashtash	20C1	24	17N	16E	3935
Norse Lake	21C17	6	16N	11E	5400
Natum	20B13	4	20N	19E	3875
Trail Creek	20B14	20	19N	20E	3360
Tunnel Avenue	21B8	13	21N	11E	2450
Walters Flat	20B15	22	20N	19E	3560
White Pass	21C9	2	13N	11E	4500
White Pass (East Side)	21C28	2	13N	11E	4500
White Pass (Leach Lake)	21C27	1	13N	11E	4500
<b>LOWER COLUMBIA DRAINAGE</b>					
<b>Mill Creek</b>					
Couse	17C3m	2	9N	35E	3370
Homestead	17C1	11	9N	40E	4030
Martin Springs (Helmers SM)	17C2M	23	9N	40E	4400
Walla Walla Diversion	18D13	22	6N	38E	2400
<b>Klickitat River</b>					
Satus Pass	20D1	21	6N	17E	4030
West Fork Cabin	21C15	23	9N	12E	3000
<b>White Salmon River</b>					
Cultus Creek	21C12	35	7N	8E	4000

NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.
Lewis River					
Blue Lake	21C22a	19	9N	8E	4800
Bob's Trail	21C21	25	8N	7E	2200
Calamity Ridge	22D1a	8	5N	5E	2500
Council Pass	21G18a	24	9N	9E	4200
Divide Meadow	21C29a	21	9N	10E	5600
Grand Meadow	21C25	28	8N	9E	3500
Lone Pine Shelter	21C26	8	9N	7E	3800
Marble Mountain	22C5a	24	8N	5E	3200
Muddy River	22C3	26	8N	6E	1400
Oldman Pass	21D19	22	6N	7E	3100
Plains of Abraham	22C1a	35	9N	5E	4400
Smith Creek Road	22C4	29	9N	6E	2100
Spencer Meadow	21C20a	16	8N	7E	3400
Surprise Lakes	21G13A	14	7N	8E	4250
Table Mountain	21C24a	20	9N	9E	4200
Timbered Peak	21D18a	36	6N	6E	3000
Cowlitz River					
Cayuse Pass	21C6	15	16N	10E	5300
Mosquito Meadows	21C19	33	10N	7E	4100
Onanapcosh	21C32	28	15N	10E	2200
Packwood Lake	21C31	21	13N	10E	2870
Pigtail Peak	21C33	11	14N	11E	5900
Potato Hill	21C14	36	10N	10E	4500
Willame Creek	21C30	3	13N	8E	3250
PUGET SOUND DRAINAGE					
Nisqually River					
Ghost Forest	21C4	23	15N	8E	4550
Longspire	21C3	29	15N	8E	2760
Paradise Park	21C2	13	15N	8E	5500
Stem Glade	21C1	13	15N	8E	5050
White River					
Corral Pass	21B13	30	18N	11E	6000
White River Entrance	21C5	4	16N	10E	3600
White River Entrance	21C16	4	16N	10E	3400
Green River					
Airstrip	21B24	18	20N	11E	1800
Charley Creek	21B25	27	21N	8E	1200
Crass Mountain No. 1	21B26	21	20N	8E	4000
Crass Mountain No. 2	21B27	14	20N	8E	2900
Crass Mountain No. 3	21B28	12	20N	8E	2100
Lester Creek	21B29	36	20N	10E	3100
Sawmill Ridge	21B31	5	19N	11E	4700
Stampede Pass	21B10	25	21N	11E	3000
Twin Camp	21B30	18	19N	11E	4100
Cedar River					
City Cabin	21B3	10	21N	10E	2390
Mt. Gardner	21B21	30	22N	10E	3300
Mt. Gardner Aux.	21B22	31	22N	10E	2500
Mt. Lindsay	21B16	31	22N	9E	2500
Mt. Washington	21B15	8	22N	9E	3000
Rex River	21B17	11	21N	9E	2400
South Fork Cedar	21B6	24	21N	10E	3000
Tinkham Creek	21B20	1	21N	10E	3400

NAME	NUMBER	SEC.	TWP.	RANGE	ELEV.
<b>Snoqualmie River</b>					
Ollalie Meadows	21B2	17	22N	11E	3625
South Fork Tolt	21B18	26	26N	9E	1900
<b>Skykomish River</b>					
Lake Elizabeth	21B19	33	26N	10E	2900
<b>Skagit River</b>					
Beaver Creek Trail	21A4	35	39N	12E	2200
Beaver Pass	21A1	9	39N	12E	3680
Devils Park	20A4	34	38N	16E	5900
Freezout Creek Trail	20A1	14	40N	14E	3500
Freezout Meadows	20A2	8	40N	16E	5000
Lake Hozomeen	21A2	19	40N	14E	2600
Meadows Cabins	20A8	29	36N	14E	1900
Thunder Basin	20A7	15	35N	14E	4200
<b>Baker River</b>					
Dock Butte	21A11A	8	36N	8E	3800
Easy Pass	21A7A	19	39N	11E	5200
Jasper Pass	21A6A	17	38N	11E	5400
Marten Lake	21A9A	23	38N	8E	3600
Rocky Creek	21A12A	20	37N	8E	2100
Schreibers Meadow	21A10A	18	37N	8E	3400
S. F. Thunder Creek	21A14A	20	36N	9E	2200
Sulphur Creek	21A13	22	37N	8E	1600
Three Mile Creek	21A15	18	36N	9E	1600
Watson Lakes	21A8	25	37N	9E	4500
<b>Nooksack River</b>					
Panorama	21A5	17	39N	9E	4300
<b>OLYMPIC PENINSULA</b>					
<b>Dungeness River</b>					
Deer Park	23B4	1	28N	5W	5200
<b>Elwha River</b>					
Hurricane	23B3	36	29N	7N	4500
<b>Skokomish River</b>					
Black and White	23B7	17	24N	5W	4200
Black and White Lakes	23B6	16	24N	5W	4700
Home Sweet Home	23B5	28	25N	5W	5200
Sundown Pass	23B8	25	24N	7W	3900

LEGEND	NUMBERING SYSTEM EXAMPLE
21A7	SNOW COURSE ONLY
21A7M	AERIAL MARKER ONLY
21A7A	SNOW COURSE AND AERIAL MARKER
21A7M	SNOW COURSE AND SOIL MOISTURE STATION
21A7M	SOIL MOISTURE STATION

## WATER SUPPLY OUTLOOK

State of Washington  
April 1, 1964

\*\*\*\*\*  
\* The water supply outlook for irrigation and power in Washington can \*  
\* be considered very good for this time of year. Precipitation, some \*  
\* in the valleys but mostly in the high mountains in the form of snow \*  
\* was exceedingly heavy during the month of March. This is a rever- \*  
\* sal of the trend which occurred during February but similar to that \*  
\* which occurred in January. The snowpack now ranges from a high of \*  
\* 145% of the 15-year normal to a low of 93% of the same period. \*  
\* Reservoirs still have below normal amounts of water in storage but \*  
\* these will comfortably fill with the spring runoff. Streamflow \*  
\* during the month of March was all well below normal with the ex- \*  
\* ception of the Similkameen River as measured near Nighthawk. \*  
\*\*\*\*\*

### PEND OREILLE-SPOKANE RIVERS

On the Pend Oreille watershed there are 8 to 10 courses with 6 to 27 years of record that are used for comparison purposes. These courses indicate a snow pack that is 212% of that which was measured last year at this time, 110% of 1962 and 116% of average. Runoff during the month of March for the Pend Oreille River was only 66% of normal.

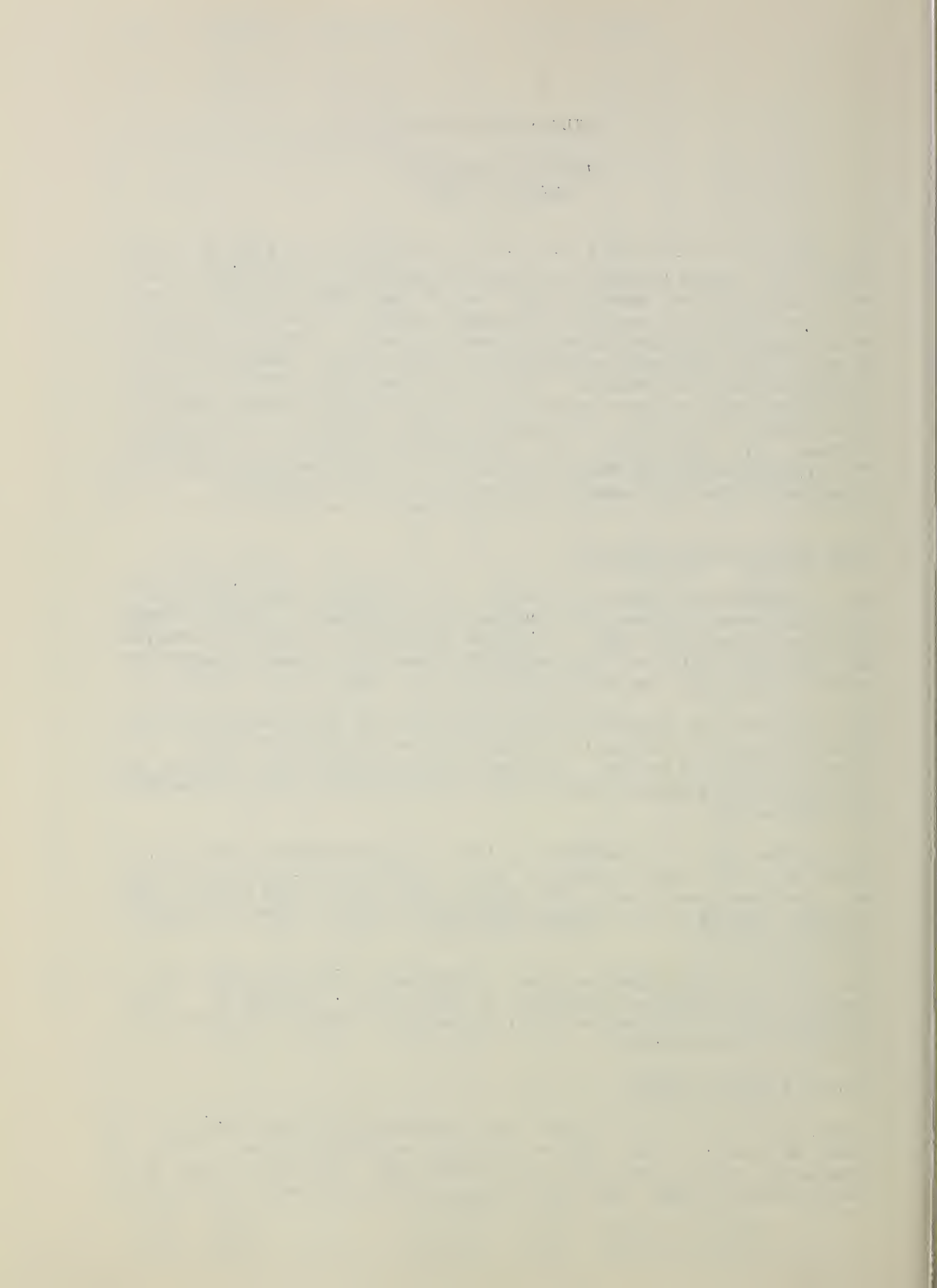
Forecasts for the Pend Oreille River as measured below Box Canyon near Lone are for flows during the April-September period of 17,050,000 acre feet or 103% of normal. The April-July and April-June figures are 15,500,000 and 13,300,000 acre feet, respectively. These percentages are 102 and 103.

The Spokane River, as measured by 12 to 13 snow courses with 4 to 38 years of record, has a snowpack that is 130% greater than that which was measured last year, 17% greater than 1962 and 25% greater than average. Runoff of the Spokane River was only 50% of normal during the month of March.

Forecasts of the Spokane River as measured near Post Falls can be found in the streamflow tabulation of this report. Storage in Coeur d'Alene Lake is very low for the first of April but this reservoir will fill with spring runoff.

### COLVILLE-KETTLE RIVERS

There are 3 to 11 snow courses on the Kettle River with from 3 to 26 years of record. These courses indicate a snowpack that is 260% of that which was measured last year at this time, only 89% of that which was measured in 1962 but still 15% greater than average. The Colville



River has only 5 courses and these have only 2 to 6 years of record. Comparing these courses with measurements made last year, the snowpack is now 507% of what was measured in 1963 and 19% greater than that measured in 1962. There is insufficient record to compare these courses to any normal.

Precipitation was below normal during the month of March as reflected by the flow of the Kettle River during the month. This river had a flow that was only 60% of normal. The Columbia at International Boundary had a flow that was 80% of normal for the month of March.

Forecasts of streamflow for these streams for the April-September period and percent of average follow: Columbia at Birchbank, 44,000,000 acre feet or 104%; Kettle, 1,920,000 or 99%; and Colville, 168,000 or 105%. The April-July and April-June period forecasts can be found in the streamflow tabulation of this report.

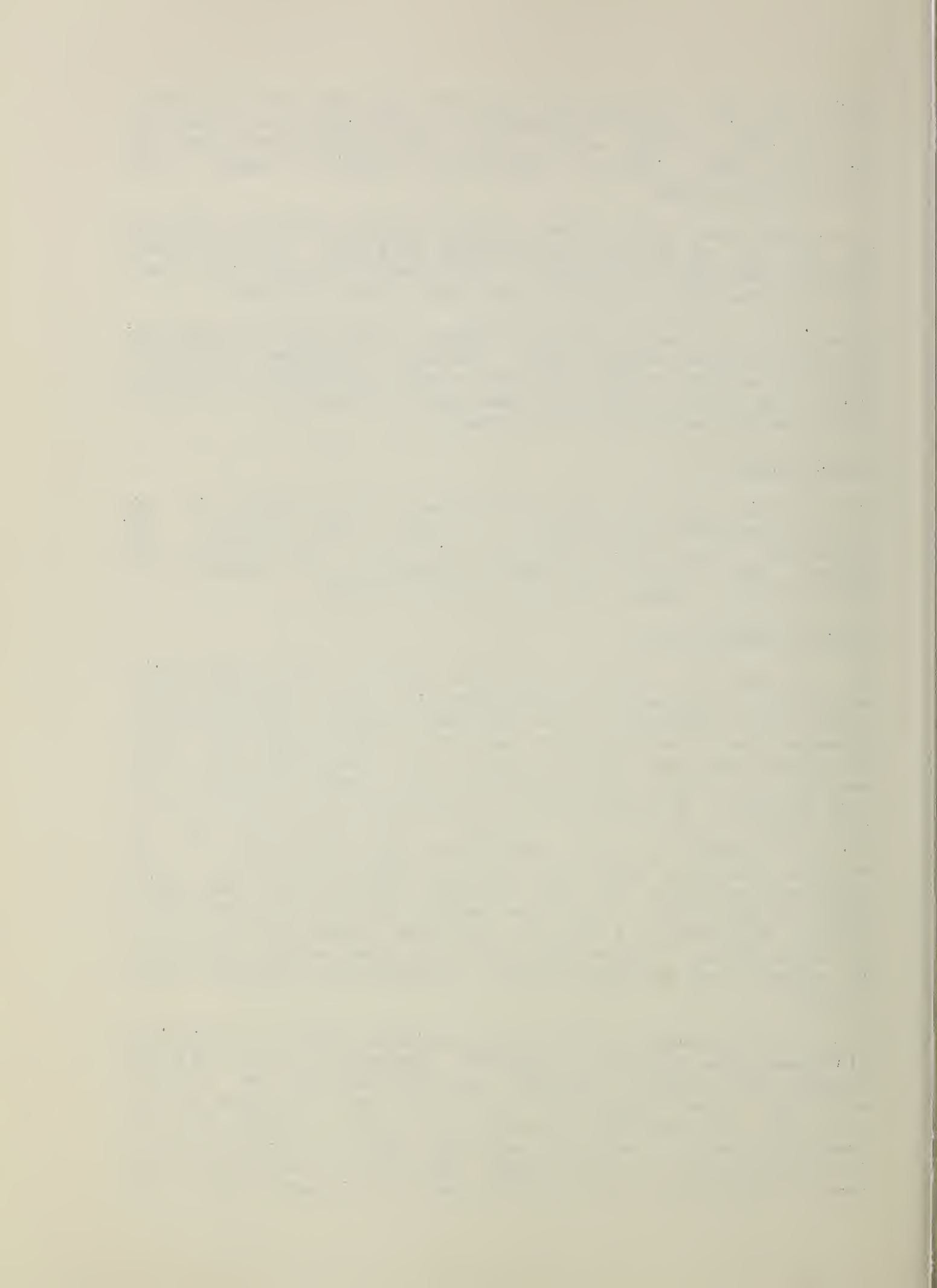
#### SANPOIL RIVER

There is only one snow course on the Sanpoil River drainage and this course is measured only on April 1. It has 25 years of record. Comparing this course with conditions last year, the snowpack is 108% greater; when compared to 1962; 3% less and when compared to the 1943-57 15-year average, the pack is exactly normal.

#### OKANOGAN-METHOW RIVERS

The outlook for irrigation and water supply in the Okanogan-Methow watersheds is expected to be good during the 1964 irrigation season. Comparison of snowpacks in these watersheds indicate conditions for the Okanogan River to be 16% greater than normal, 43% greater than 1962 and 85% greater than that which was measured last year at this time. There are 23 to 33 courses in this comparison with a length of record of from 1 to 28 years. The Methow River, as measured by 5 to 9 courses with 3 to 24 years of record, has a snowpack that is 44% greater than that which was measured last year, 82% greater than 1962 and 7% less than average. The heavy snows which fell throughout most of the Cascade range and occurred in the high Okanogan portion of the watershed in Canada did not occur in the low lands of the American portion of the basin. This accounts for the low percentage figures that are found on the Methow River. Precipitation in the American portion of the basin, for example, was only 65% of normal as measured at Conconully Weather Station.

Forecasts of streamflow for the April-September period are as follows: Similkameen near Nighthawk, 1,670,000; Okanogan at Oroville, 835,000, Okanogan near Tonasket, 2,000,000; and Methow near Pateros, 1,210,000 acre feet. These figures are, with respect to the 15-year average, 102%, 110%, 104% and 106%, respectively. Inflow to Salmon Lake and Conconully Reservoir during the April-July period is expected to be only 16,000 acre feet or 70% of normal. This flow is considerably dependent upon late spring precipitation and this forecast is based on the



premise that precipitation will be normal. Greater or lesser amounts will adjust the flow figures accordingly.

The soil moisture station at Trout Creek snow course in Canada indicates a soil mantle that is wetter than has been measured the last two years. The length of record of this station is not long enough to determine what should be normal for this area.

River flows for the Okanogan, Similkameen and Methow during the month of March are 93%, 116% and 91%, respectively. The Similkameen has had consistently high runoff during the past several months. The only other river in the northwest that had similar runoff is the Fraser River as measured near Hope, B. C.

#### WENATCHEE-CHELAN-ENTIAT RIVERS

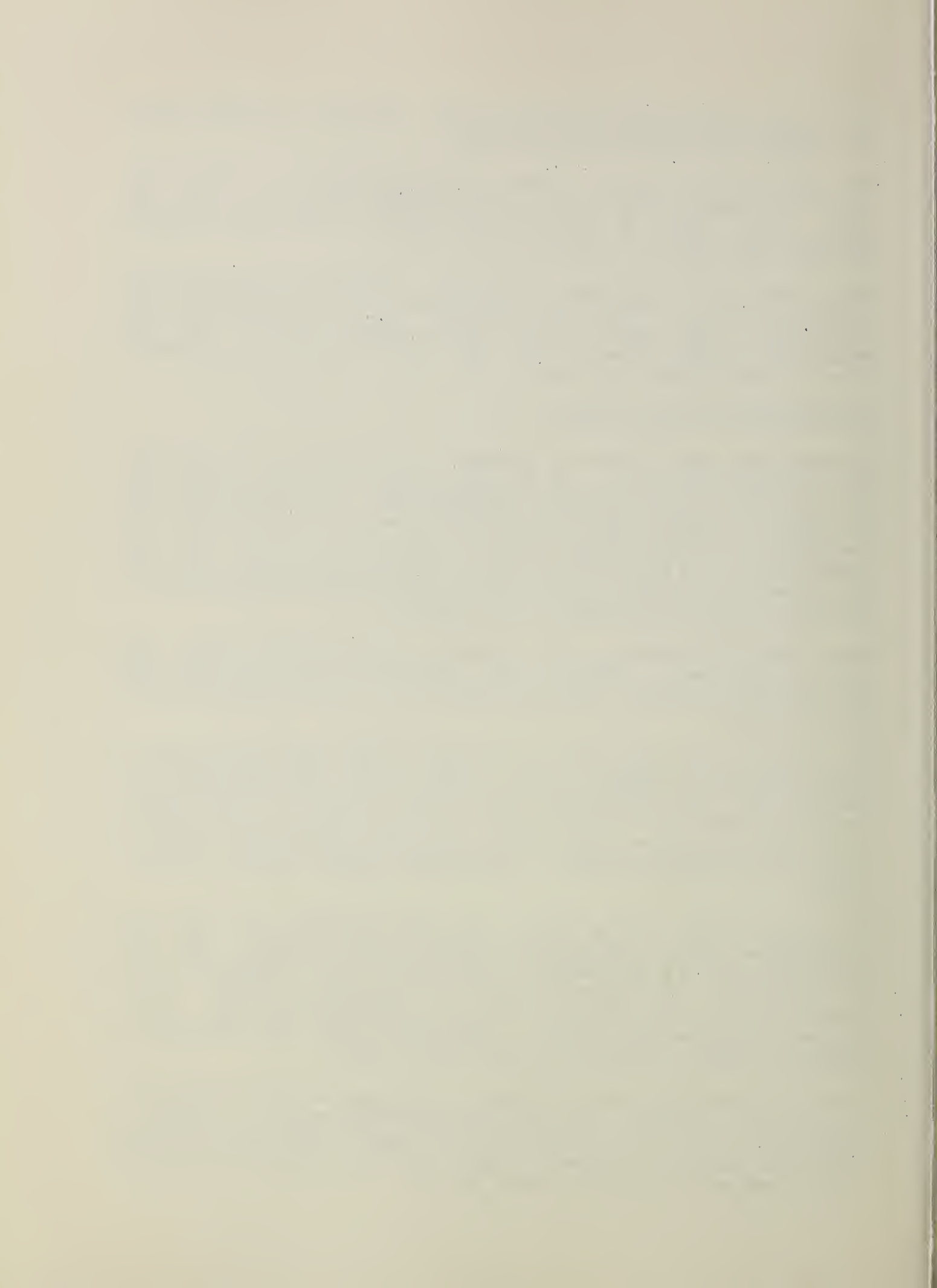
Eighteen snow courses have been measured on the Chelan River watershed for the last thirty years. A thorough analysis of these courses was made last fall by three separate organizations. It was concluded that the number of courses could be eliminated down to three high elevation courses and--time permitting--to two low elevation courses. This way measurements could be made in one day by using a helicopter. The analysis showed that three to five snow courses would give as accurate a forecast as could be obtained by the eighteen.

These three snow courses, when compared to the snowpack of the same three in past years, indicate snow conditions to be 103% better than was measured last year, 57% better than 1962, and 13% better than the 15-year normal.

The Wenatchee watershed with 3 to 8 snow courses and 3 to 21 years of record indicates a snowpack that is 431% greater than that which was measured last year, 49% greater than 1962 and 25% greater than average. The Entiat River snow course has only 3 years of record and in 1963 and 1962 there was no snow on the course. This year there was 12 inches of snow with 5.3 inches of water. A percentage figure would be unrealistic.

Forecasts of the Chelan River for April-September are for flows 1,390,000 acre feet or 8% greater than the 15-year average. The Stehekin River for the same period is expected to flow 1,000,000 acre feet or 11% greater. The Wenatchee River, as measured near Plain, is expected to flow 1,440,000 and at Peshastin, 1,990,000 acre feet. These are both 7% greater than normal. The Stemilt basin near Wenatchee is expected to have a runoff of 127,000 Miners inches.

Runoff for the Chelan River adjusted for storage was 84% of normal during the month of March and the Wenatchee River was 81%. Storage in Lake Chelan is well below normal for this time of year and considerably below that which was measured last year, but this reservoir is expected to fill and spill during the runoff season.



## YAKIMA RIVER

The outlook for irrigation and water supply in the Yakima watershed as of April 1 is good. The snowpack measured near the first of April by 15 to 24 snow courses with 3 to 45 years of record is 193% greater than that measured last year at this time, 41% greater than 1962 and 11% greater than average. On the Ahtanum drainage with 2 courses with 14 to 15 years of record, the snowpack is 69% greater than last year, 2% greater than 1962 and 20% greater than average.

Reservoirs in this watershed have less water in storage than any time since 1956 and possibly farther. Monthly inflow likewise has been less during the month of March than any time since 1956 and it too possibly farther back. Even with this lack of storage and the lack of inflow to the reservoirs during the month of March, all of these reservoirs are expected to fill with the spring runoff.

Forecasts for the Yakima River system for the April-September period are as follows: Yakima near Martin, 165,000 acre feet or 104%; at Cle Elum, 1,150,000 or 112%; and near Parker, 2,110,000 or 107%. The tributary streams to the Yakima River mainstem for the same period are as follows: Kachess near Easton, 154,000 or 112%; Cle Elum near Roslyn, 555,000 or 107%; Bumping near Nile, 165,000 or 102%; American near Nile, 138,000 or 101%; Tieton as measured at Tieton Dam, 278,000 or 102%; and combined flows of these above three tributaries as measured at Naches, 999,000 acre feet or 102%. Ahtanum Creek (combined flow north and south) is expected to flow 49,000 acre feet or 94% of the 15-year normal.

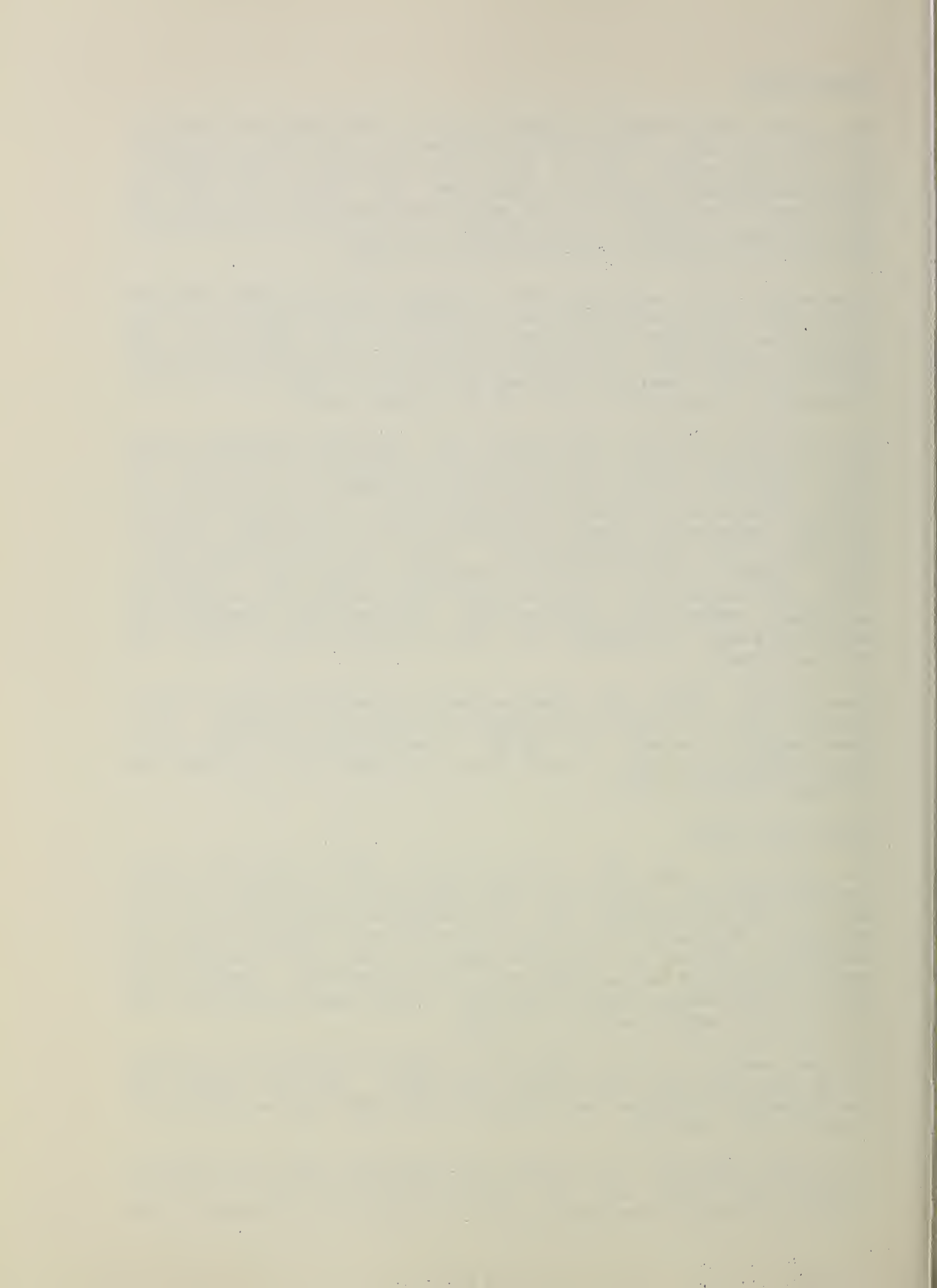
Precipitation during the month of March as measured at the 5 reservoirs by the U. S. Bureau of Reclamation totaled 24.53 inches. This, when compared to normal, is 103.8%. Precipitation for the period since September 1, 1963 is 184.55 inches for these same 5 stations and averages 92.6% of normal.

## WALLA WALLA RIVER

The outlook for the 1964 irrigation water supply in the Walla Walla watershed has been improved over that which was in existence one month ago. It has even improved over that which was reported the first of February. The heavy mountain precipitation which occurred during the month has increased the snowpack until it is now 129% of average and 732% of that which was measured last year at this time. There is one area of unsatisfactory water conditions in the complete watershed and this is below McKay Reservoir in Oregon.

The soil mantle is wetted to 86% of its capacity which is an increase of 6% over that which was reported last month. This will improve the spring runoff conditions and accounts in part for the increased forecasts for the watershed.

Streamflow forecasts as of April 1 for the Walla Walla South Fork as measured near Milton are for a flow of 80,000 acre feet or 105% of normal for the April-September period. The April-July forecast is for



a flow 66,000 acre feet or 106%. Mill Creek as measured near Walla Walla is expected to have a flow of 39,000 acre feet or 115% of the 15-year average for the April-September period. The April-July and April-June forecasts are for 34,000 and 31,000 acre feet, respectively. This is 113% and 115% of normal. Runoff of the Walla Walla River as measured near Touchet during the month of March was 45% of normal.

It is expected that during the summer months, additional snow courses will be established in this watershed. It is hoped that these new courses will enable the water users in the watershed to make a better evaluation of their prospective water supplies.

#### LOWER COLUMBIA DRAINAGE

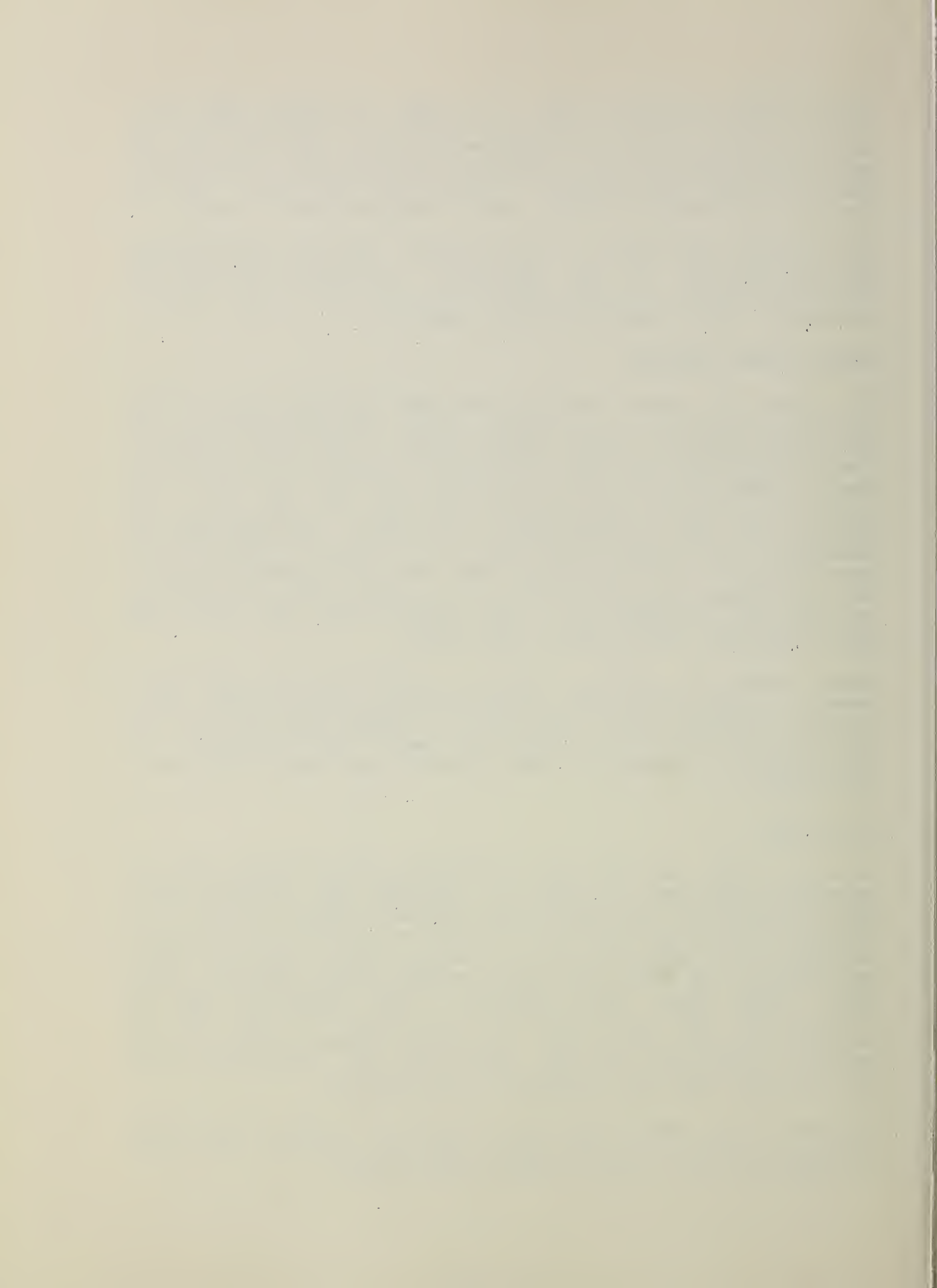
The outlook for water supplies in the Lower Columbia portion of the state and tributaries to the Columbia River from Washington is for good runoff during the spring snowmelt season. Snow cover of the Mill Creek and Klickitat River have insufficient records to be compared to normal. The White Salmon as measured by two snow courses is 158% greater than that which was measured last year at this time; 21% greater than 1962; and 8% greater than normal. The Lewis River as measured by 5 to 16 snow courses with up to 20 years of record is 191% greater than last year, 30% greater than 1962 and 6% greater than normal. The Cowlitz as measured by 6 to 10 courses with up to 24 years of record has a snowpack that is 164% greater than last year, 35% greater than 1962 and 4% greater than normal.

Runoff during the month of March on the Klickitat was only 52% of normal; the Walla Walla, 45%; and the Cowlitz, 87% of normal. Forecasts of streamflow for the Lewis River as measured near Ariel for the April-September period is 1,450,000 acre feet or 103% of normal. The Cowlitz River is expected to flow 3,080,000 acre feet or 7% greater than normal.

#### PUGET SOUND

Again this month the snow cover is generally the best of any that was measured in the state as of April 1. Although many of these watersheds have only one snow course with sufficient length of record to be compared with average, these snow courses are still considered representative of the snowpack in the watersheds. Snowpack for the several watersheds as compared to the 1943-57 average follow: Nisqually, 124%; White, 107%; Green, 108%; Snoqualmie, 131%; Skykomish, 144%; and Skagit, 110%. When these watersheds are compared with the snowpack measured last year at this time, percentage figures range from 36% greater to 422% greater and when compared with the measurements taken in 1962, they range from 18% greater to 86% greater.

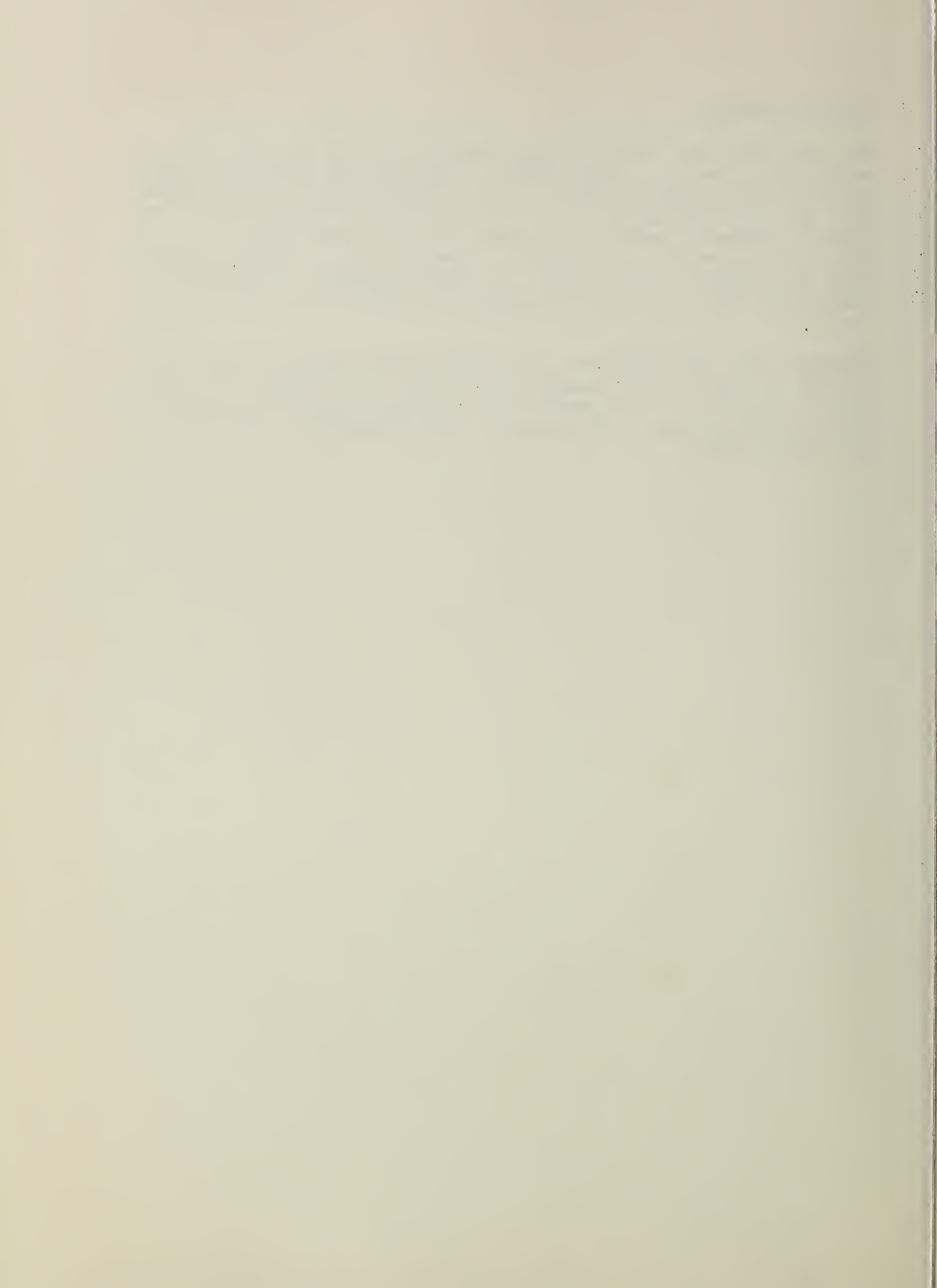
Forecasts are not made by the Soil Conservation Service on any stream flowing from the Cascades into Puget Sound, but flows are expected to be normal and above during the spring runoff season.



## OLYMPIC PENINSULA

There are five snow courses on the Olympic Peninsula that are used for comparison purposes. By watersheds, the Skokomish measured by three courses with 14 years of record has a snowpack that is 155% greater than last year, 55% greater than 1962 and 1% greater than normal. The Elwha and Dungeness measured by one snow course each have a snowpack that is, for the Elwha, 309% greater than last year, 72% greater than 1962, and 4% greater than normal. For the Dungeness, the snowpack is 125% greater than last year, 53% greater than 1962 and 8% less than normal.

Forecasts for the Dungeness as measured near Sequim are for flows 190,000 acre feet or 12% greater than normal for the April-September period. April-July and April-June flows are expected to be 158,000 and 121,000 acre feet, respectively. Percentagewise, these figures are 114% and 116%.

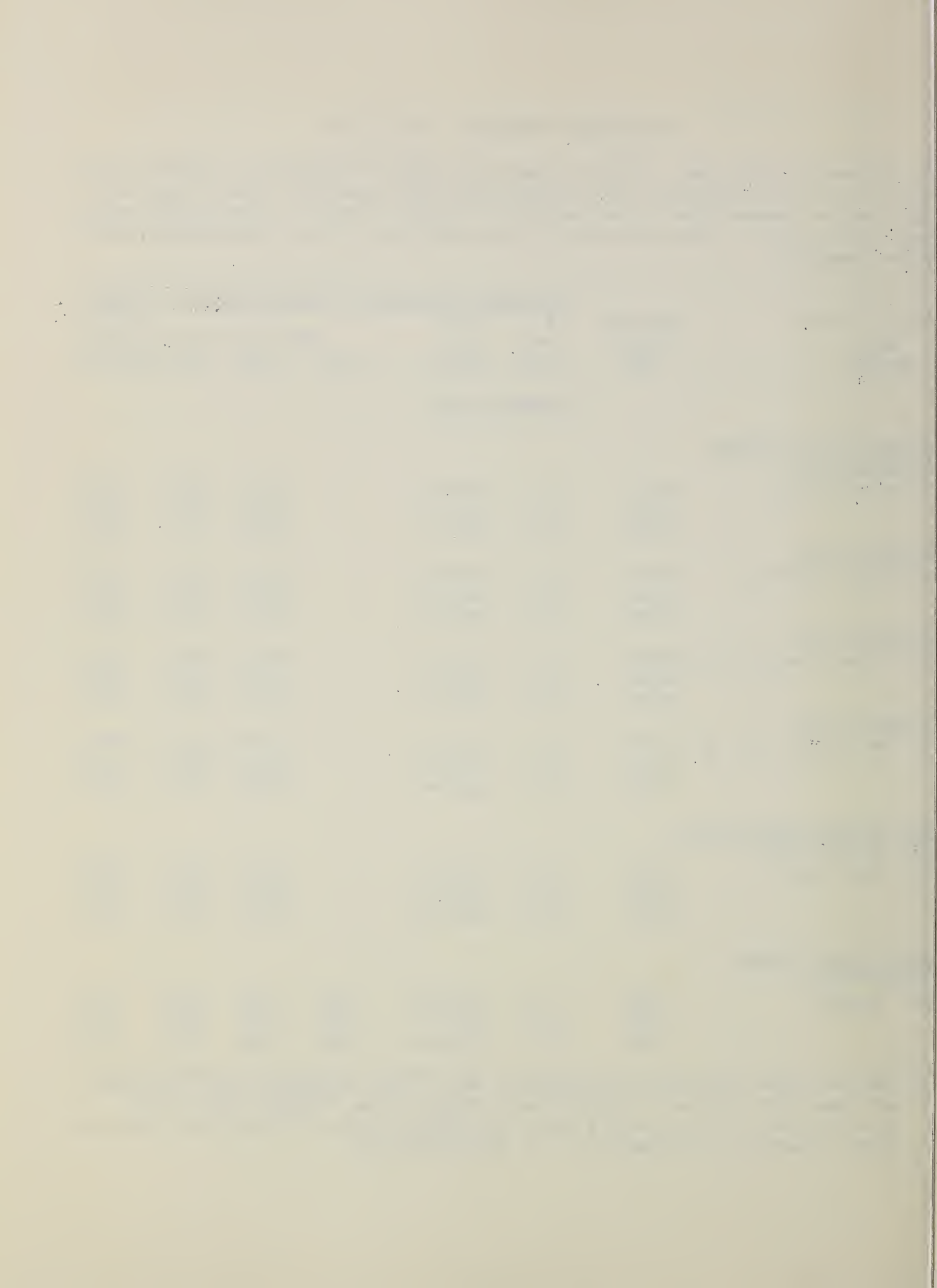


# STREAMFLOW FORECASTS - APRIL 1964

The following summarized runoff forecasts are based principally on mountain snow cover and on the assumption that precipitation and temperature will be near average from the present time to the end of the forecast period. Appreciable deviations from normal of temperature and/or precipitation will correspondingly modify these forecasts.

Basin, Stream and Station	Forecast Runoff 1964	Seasonal Streamflow in Thousands of Acre-Feet				
		% 15-Yr. Avg.	Fore- cast Period	Measured 1963	Runoff 1962	15-Yr. Average 1961 1943-57
<u>COLUMBIA BASIN</u>						
<u>Columbia River System</u>						
<u>Columbia River</u>						
at Birchbank <u>1/</u>	44300	104	Apr-Sep	41157	48678	42709
	34950	104	Apr-Jul	31340	39793	33646
	25100	106	Apr-Jun	21738	31161	23600
<u>Columbia River</u>						
at Grand Coulee <u>1/</u>	70000	104	Apr-Sep	62511	71701	67448
	59500	105	Apr-Jul	51153	61470	56513
	46000	106	Apr-Jun	39741	51164	43374
<u>Columbia River</u>						
bl. Priest Rapids Dam <u>1/</u>	76850	104	Apr-Sep	67661	78160	74246
	64000	103	Apr-Jul	55670	67352	62298
	50750	106	Apr-Jun	43323	55961	47840
<u>Columbia River</u>						
at The Dalles, Ore. <u>1/</u>	107600	101	Apr-Sep	92980	101454	106063
	91000	101	Apr-Jul	77320	87843	90194
	74000	103	Apr-Jun	62704	74451	71981
<u>Pend Oreille River System</u>						
<u>Pend Oreille River</u>						
bl. Box Canyon	17050	103	Apr-Sep	15021	15435	16558
	15500	102	Apr-Jul	13911	14521	15217
	13300	103	Apr-Jun	12466	13273	12928
<u>Kettle River System</u>						
<u>Kettle River</u>						
nr. Laurier	1920	99	Apr-Sep	1399	1656	2095
	1860	101	Apr-Jul	1338	1570	2048
	1670	100	Apr-Jun	1200	1433	1961

1/ Observed flow corrected for storage in any of the following reservoirs which are above the station: Kootenay Lake, Hungry Horse, Flathead Lake, Pend Oreille Lake, F. D. Roosevelt Lake, Lake Chelan, Coeur d'Alene Lake, Brownlee, Noxon Reservoir and pumpage at F. D. Roosevelt Lake.



# Streamflow Forecasts - April 1964 (Cont'd)

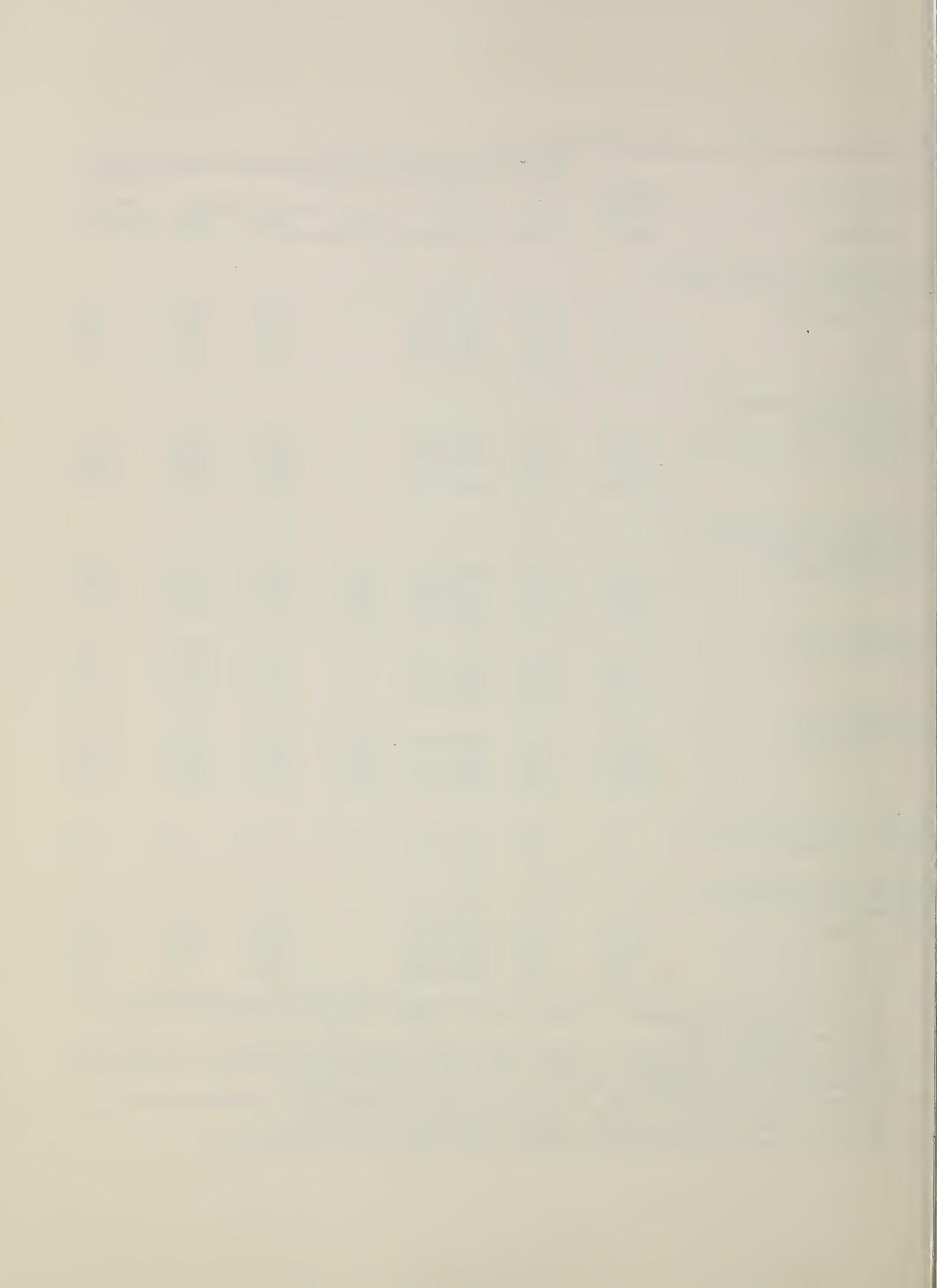
Streamflow Forecasts April 1964 (Cont'd)		Seasonal Streamflow in Thousands of Acre-Feet					
Basin, Stream and Station	Forecast Runoff 1964	% 15-Yr. Avg.	Fore- cast Period	Measured 1963	Runoff 1962	Runoff 1961	15-Yr. Average 1943-57
<u>Kettle River System (Cont'd)</u>							
Colville River							
at Kettle Falls	168	105	Apr-Sep		126	233	160
	155	105	Apr-Jul		115	217	148
	144	106	Apr-Jun		108	202	136
<u>Spokane River System *</u>							
Spokane River							
at Post Falls, Ida. <u>2/</u>	3400	105	Apr-Sep		3123	3019	3251
	3300	105	Apr-Jul		3039	2958	3154
	3150	105	Apr-Jun		2933	2860	2997
<u>Okanogan River System **</u>							
Similkameen River							
nr. Nighthawk	1670	102	Apr-Sep	1218	1120	1499	1640
	1560	102	Apr-Jul	1066	1038	1438	1527
	1375	105	Apr-Jun	850	891	1318	1304
Okanogan River							
at Oroville <u>3/</u>	835	110	Apr-Sep		672	661	757
	770	109	Apr-Jul		591	645	706
	715	110	Apr-Jun		524	602	648
Okanogan River							
nr. Tonasket	2000	104	Apr-Sep	1238	1254	1669	1920
	1820	105	Apr-Jul	1078	1140	1557	1740
	1560	106	Apr-Jun	854	977	1409	1469
Salmon Lake-Conconully							
Res. - Inflow	16	70	Apr-Jul	14	6	16	23
<u>Methow River System **</u>							
Methow River							
nr. Pateros	1210	106	Apr-Sep		633	1078	1145
	1130	106	Apr-Jul		570	1032	1070
	970	106	Apr-Jun		483	946	914

\* Forecasts made by Morlan W. Nelson and J. Alden Wilson, Soil Conservation Service, Boise, Idaho

\*\* These forecasts are based in part upon base flow data especially prepared and furnished for the purpose by the U. S. Geological Survey.

2/ Observed flow corrected for storage in Coeur d'Alene Lake and diversions by Spokane Valley Farms Company and Rathdrum Prairie Canals.

3/ Observed flow corrected for storage, diversions and evaporation.



# Streamflow Forecasts - April 1964 (Cont'd)

Basin, Stream and Station	Forecast Runoff 1964	Seasonal Streamflow in Thousands of Acre-Feet					
		% 15-Yr. Avg.	Fore- cast Period	Measured 1963	Runoff 1962	Runoff 1961	15-Yr. Average 1943-57
<u>Chelan River System</u>							
Chelan River							
at Chelan <u>4/</u>	1390	108	Apr-Sep		940	1333	1288
	1250	110	Apr-Jul		827	1221	1140
	1000	111	Apr-Jun		651	1032	902
Stehekin River							
at Stehekin	1000	111	Apr-Sep		744	991	897
	860	111	Apr-Jul		629	874	773
	650	111	Apr-Jun		482	724	587
<u>Wenatchee River System</u>							
Wenatchee River							
at Plain	1440	107	Apr-Sep		1054	1396	1343
	1310	107	Apr-Jul		952	1303	1221
	1070	110	Apr-Jun		767	1124	973
Wenatchee River							
at Peshastin	1990	107	Apr-Sep		1457	1892	1862
	1825	107	Apr-Jul		1324	1776	1704
	1500	110	Apr-Jun		1069	1543	1367
Stemilt Basin							
nr. Wenatchee	127*	--	May-Sep		146*	128*	--
<u>Yakima River System</u>							
Yakima River							
nr. Martin <u>5/</u>	165	104	Apr-Sep		114	152	158
	154	105	Apr-Jul		106	145	147
	134	106	Apr-Jun		94	136	127
Yakima River							
at Cle Elum <u>6/</u>	1150	112	Apr-Sep		842	1026	1029
	1070	112	Apr-Jul		766	965	951
	940	114	Apr-Jun		678	881	824
Yakima River							
nr. Parker <u>7/</u>	2110	107	Apr-Sep		1404	1974	1967
	2100	108	Apr-Jul		1395	1996	1947
	1925	108	Apr-Jun		1309	1920	1779

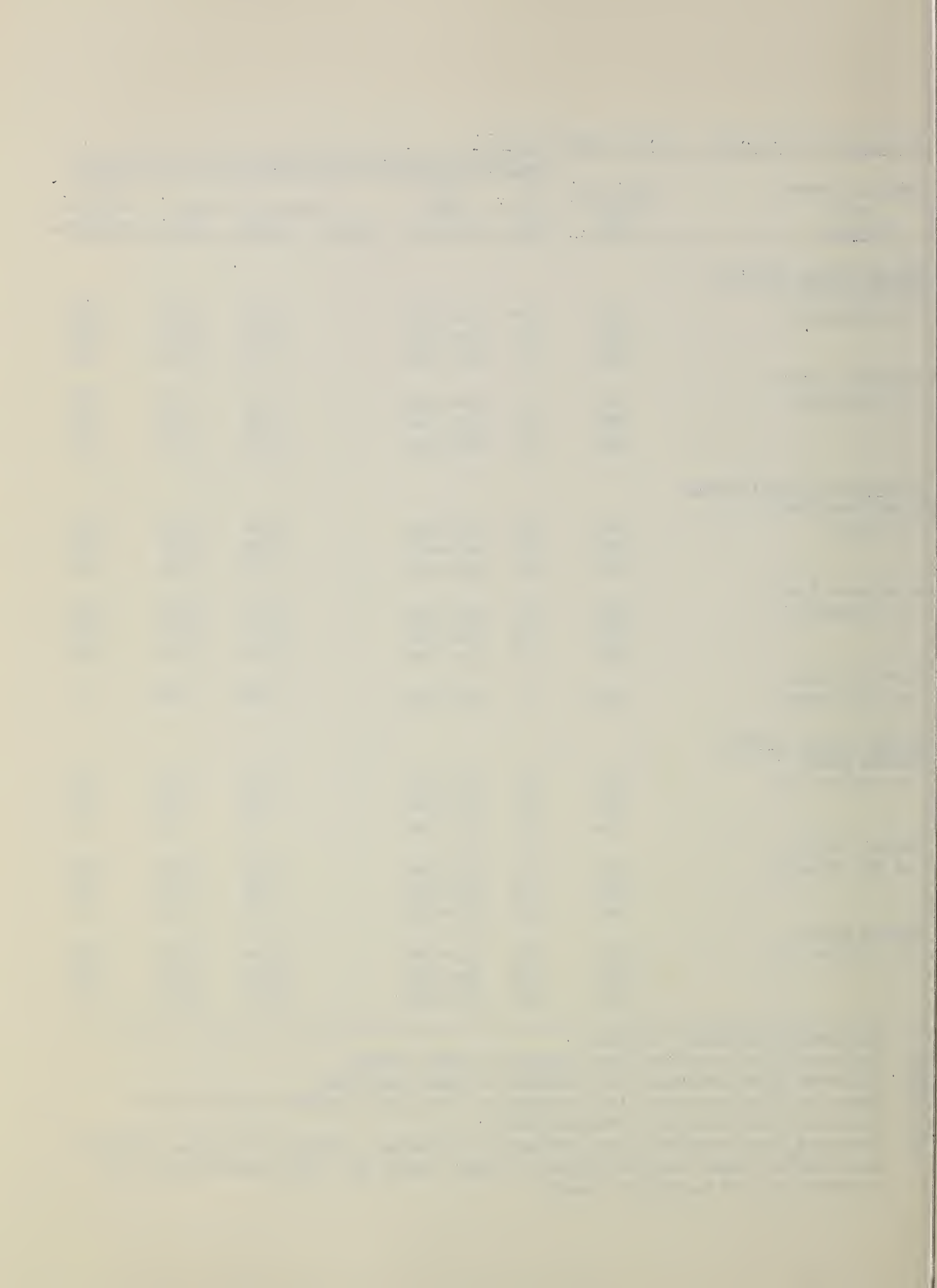
\* Thousands of Miners' inches.

4/ Observed flow corrected for storage in Lake Chelan.

5/ Observed flow corrected for storage in Lake Keechelus.

6/ Observed flow corrected for storage in Keechelus, Kachess and Cle Elum Lakes and diversion by Kittitas Canal.

7/ Observed flow corrected for storage in Keechelus, Kachess, Cle Elum, Bumping and Rimrock Lakes and diversions by Roza, Union Gap, New Reservation, Old Reservation and Sunnyside Canals.



# Streamflow Forecasts - April 1964 (Cont'd)

Streamflow Forecasts - April 1964 (Cont'd)		Seasonal Streamflow in Thousands of Acre-Feet					
Basin, Stream and Station	Forecast Runoff 1964	% 15-Yr. Avg.	Fore- cast Period	Measured 1963	Runoff 1962	Runoff 1961	15-Yr. Average 1943-57
<u>Yakima River System (Cont'd)</u>							
Kachess River							
nr. Easton <u>8/</u>	154	112	Apr-Sep		108	137	138
	147	110	Apr-Jul		102	134	133
	132	113	Apr-Jun		93	125	117
Cle Elum River							
nr. Roslyn <u>9/</u>	555	107	Apr-Sep		418	522	518
	515	108	Apr-Jul		388	490	479
	445	110	Apr-Jun		334	437	403
Bumping River							
nr. Nile <u>10/</u>	165	102	Apr-Sep		128	168	161
	153	103	Apr-Jul		117	158	149
	129	107	Apr-Jun		98	137	121
American River							
nr. Nile	138	101	Apr-Sep		105	152	137
	128	101	Apr-Jul		96	143	127
	109	103	Apr-Jun		80	125	106
Tieton River							
at Tieton Dam <u>11/</u>	278	102	Apr-Sep		218	279	273
	242	102	Apr-Jul		186	240	236
	196	104	Apr-Jun		150	200	188
Naches River							
nr. Naches <u>12/</u>	990	102	Apr-Sep		738	1020	974
	910	102	Apr-Jul		664	939	894
	790	104	Apr-Jun		568	832	761
Ahtanum Creeks							
nr. Tampico <u>13/</u>	49	94	Apr-Sep		41	58	52
	45	94	Apr-Jul		38	54	48
	41	98	Apr-Jun		33	49	42
<u>Lower Columbia River System</u>							
Mill Creek							
nr. Walla Walla	39	115	Apr-Sep	20	27	27	34
	34	113	Apr-Jul	17	23	23	30
	31	115	Apr-Jun	15	21	21	27

8/ Observed flow corrected for storage in Lake Keechelus.

9/ Observed flow corrected for storage in Lake Cle Elum.

10/ Observed flow corrected for storage in Bumping Lake.

11/ Observed flow corrected for storage in Rimrock Lake.

12/ Observed flow corrected for storage in Bumping and Rimrock Lakes and diversions by Tieton, Selah Valley, Wapatox Canals and City of Yakima.

13/ Observed flow of North and South Forks (combined).

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Streamflow Forecasts - April 1964 (Cont'd)

Basin, Stream and Station	Forecast Runoff 1964	Seasonal Streamflow in Thousands of Acre-Feet				
		% 15-Yr. avg.	Fore- cast Period	Measured 1963	Runoff 1962 1961	15-Yr. Average 1943-57

Lower Columbia River System (Cont'd)

Lewis River

at Ariel 14/

1450	103	Apr-Sep	1209	1247	1409
1290	103	Apr-Jul	1066	1105	1254
1150	104	Apr-Jun	974	1007	1100

Cowlitz River

at Castle Rock 15/

3080	107	Apr-Sep	2644	2802	2870
2750	108	Apr-Jul	2333	2516	2553
2320	107	Apr-Jun	2038	2230	2167

OLYMPIC PENINSULA

Dungeness River System

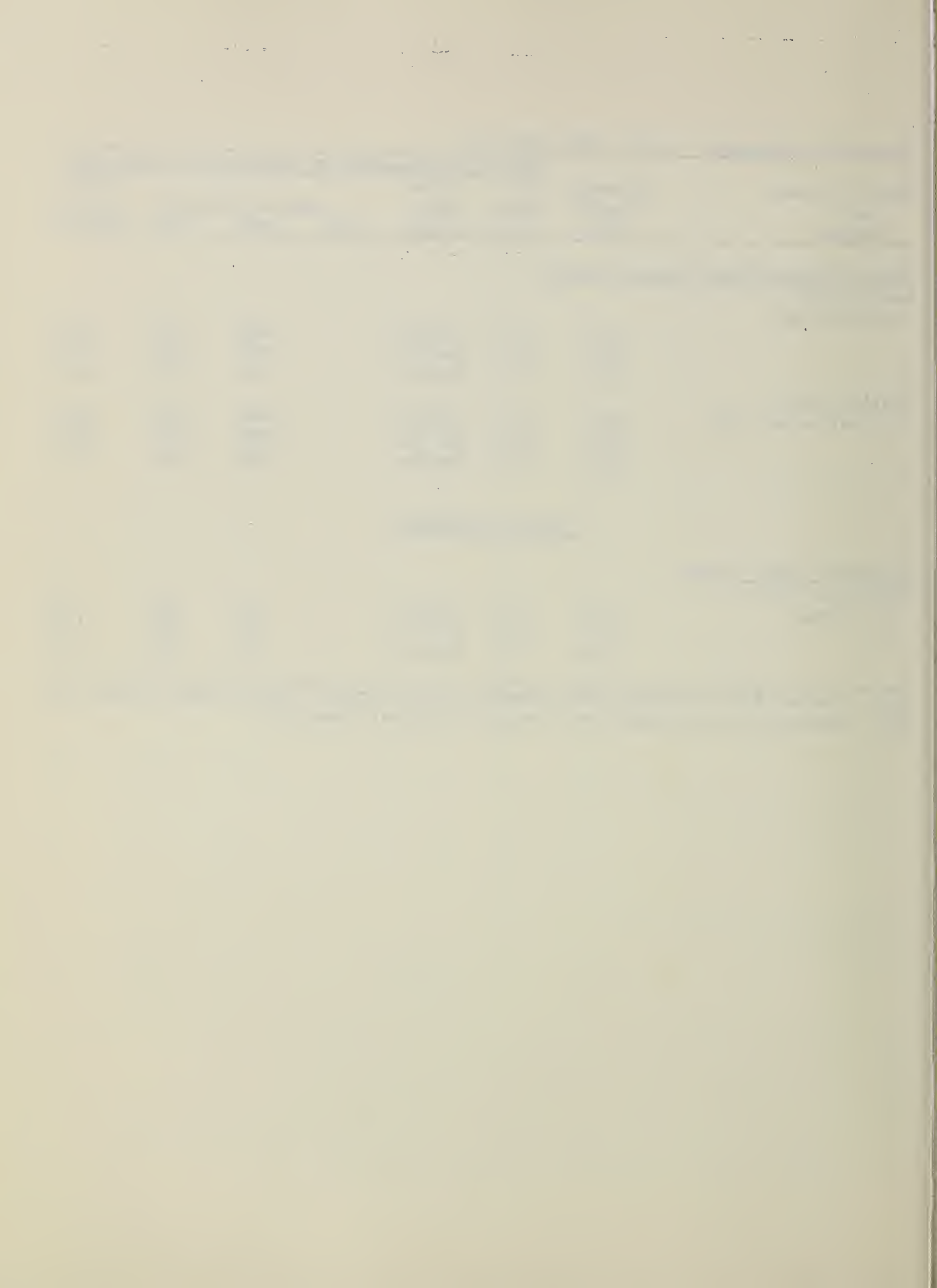
Dungeness River

nr. Sequim

190	112	Apr-Sep	124	196	169
158	114	Apr-Jul	100	166	139
121	116	Apr-Jun	74	125	104

14/ Observed flow corrected for storage in Lake Merwin, Yale and Swift Reservoirs.

15/ Observed flow corrected for storage in Mayfield Reservoir.



# COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

The following tabulation of Washington stream basins presents the water content of the snow about April 1, 1964 as per cent of the same date in 1963 and 1962 and average of record.

Tributary Basin	No. of Courses Average	Years of Record	1964 Snow Water Expressed as per cent of		
			1963	1962	1943-57 Avg.

## UPPER COLUMBIA BASIN

Pend Oreille	8 - 10	6 - 27	212	110	116*
Kettle	3 - 11	3 - 26	260	89	115*
Colville	5	2 - 6	507	119	--
Spokane	12 - 13	4 - 38	230	117	125*
Sanpoil	1	25	208	97	100
Okanogan	23 - 33	1 - 28	185	143	116*
Methow	5 - 9	3 - 24	144	182	93*
Chelan	3	30 - 32	203	157	113*
Wenatchee	3 - 8	3 - 21	531	149	125*
Yakima	15 - 24	3 - 45	293	141	111*
Ahtanum	2	14 - 15	169	102	120*

## LOWER COLUMBIA BASIN

Mill Creek	3	7 - 9	771	123	--
Klickitat	2	7 - 9	--	83	--
White Salmon	2	19 - 20	258	121	108*
Lewis	5 - 16	1 - 20	291	130	106*
Cowlitz	6 - 10	1 - 24	264	135	104*

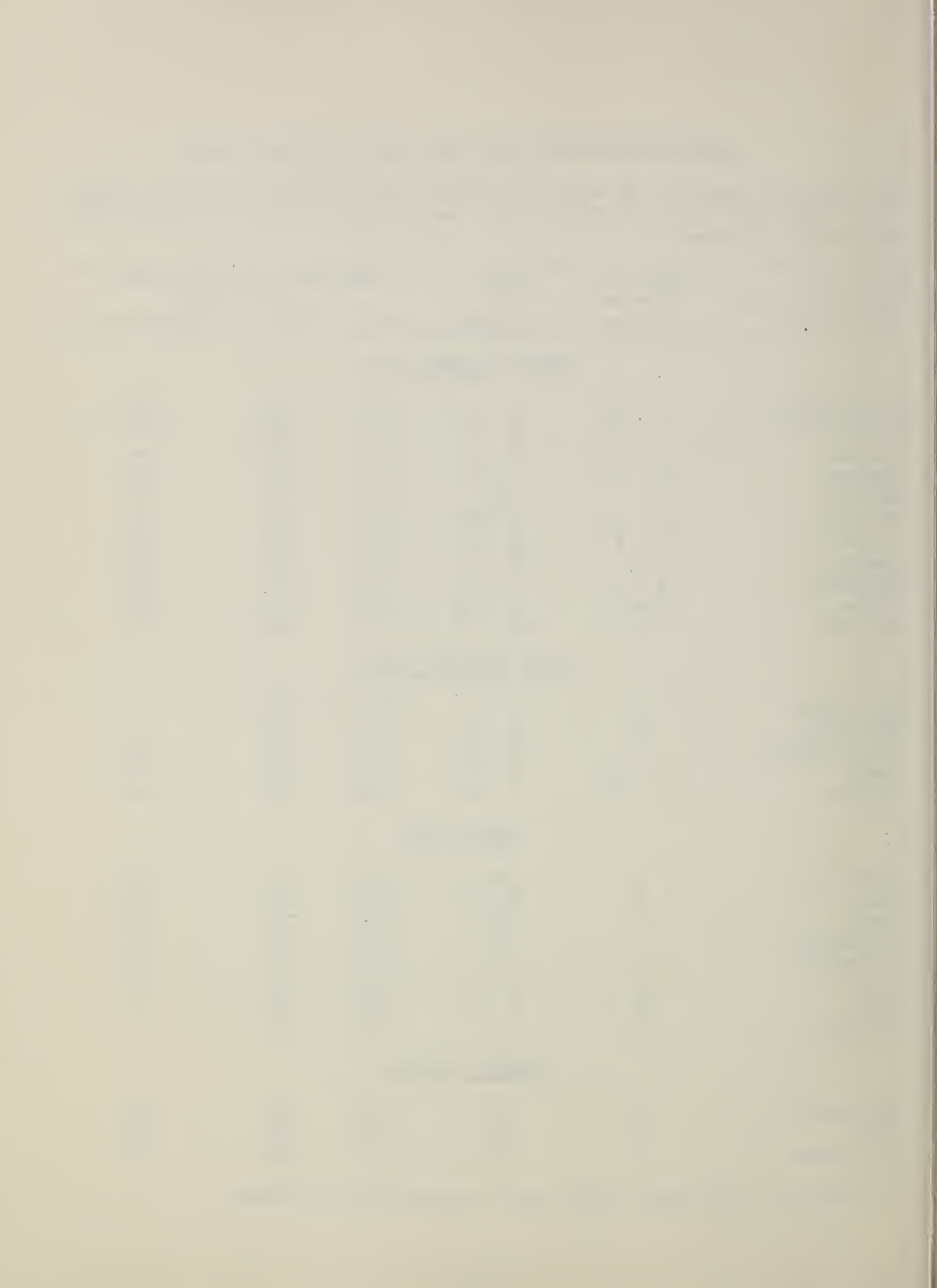
## PUGET SOUND

Nisqually	4	14	252	151	124*
White	5	8 - 24	222	141	107*
Green	1	18	232	153	108*
Snoqualmie	1	19	522	186	131*
Skykomish	1	19	300	167	144*
Skagit	14	13 - 30	240	170	110*
Baker	12	4 - 7	208	154	--
Nooksack	1	7	136	118	--

## OLYMPIC PENINSULA

Skokomish	3	14	255	155	101*
Elwha	1	14	409	171	104*
Dungeness	1	15	225	153	92*

\* Records of less than 15 years used in computation of average



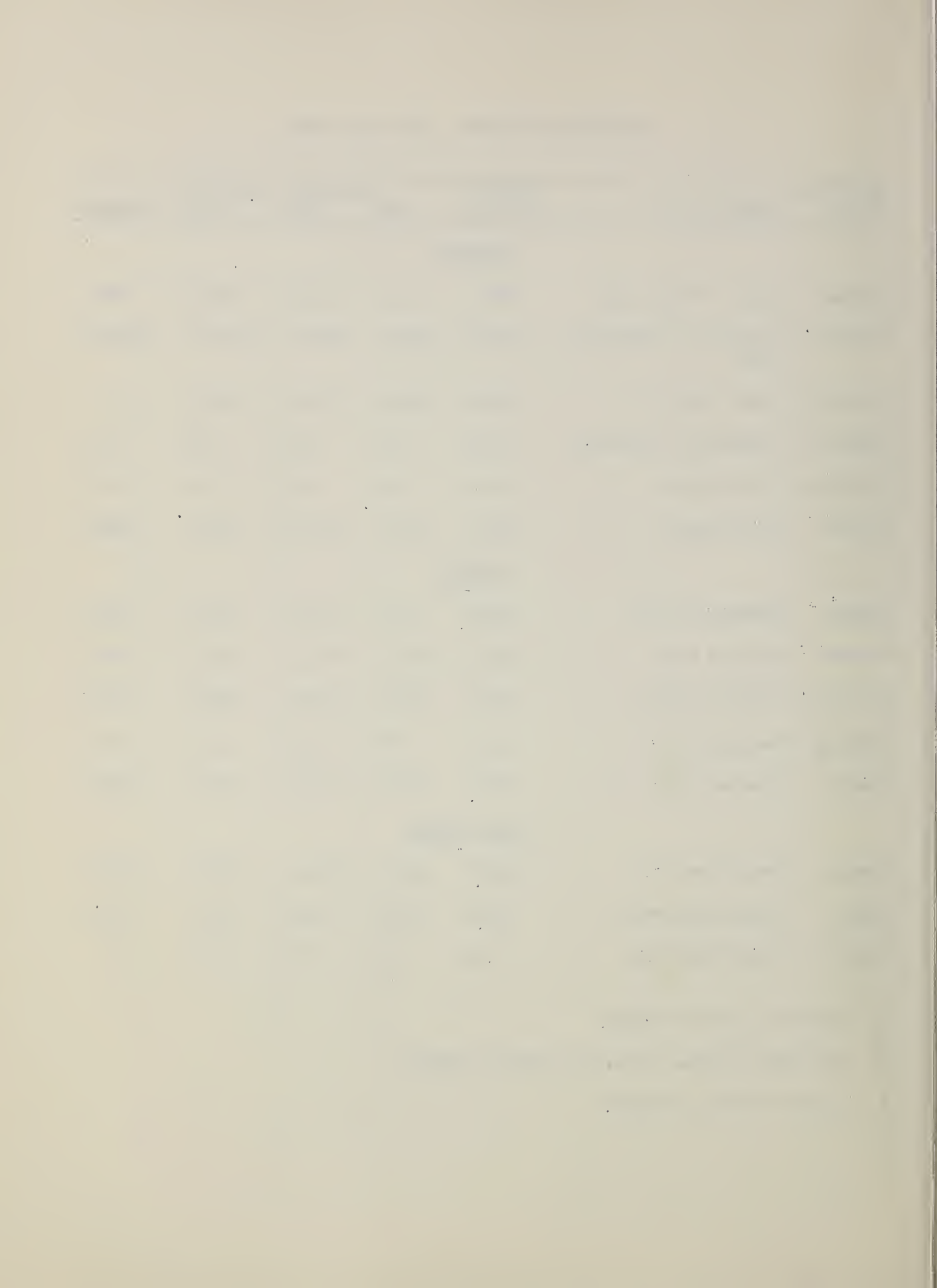
# RESERVOIR STORAGE - 1000 Acre Feet

BASIN or STREAM	RESERVOIR <u>1/</u>	USABLE CAPACITY	Measured (April 1)			Normal*
			1964	1963	1962	
<u>COLUMBIA</u>						
Spokane	Coeur d'Alene Lake	889.0	93.0	177.0	157.0	168.5
Columbia	Franklin D. Roosevelt Lake	5232.0	2426.0	2803.0	2662.0	3637.8
Columbia	Banks Lake <u>2/</u>	761.8	326.9	297.0	486.4	---
Okanogan	Conconully Reservoir	13.0	4.8	5.6	5.6	7.5
Okanogan	Salmon Lake	10.5	9.5	5.1	7.6	8.8
Chelan	Lake Chelan	676.1	131.9	326.0	140.2	208.4
<u>YAKIMA</u>						
Yakima	Keechelus Lake	157.8	70.7	139.4	110.6	96.2
Kachess	Kachess Lake	239.0	151.4	231.0	193.8	180.7
Cle Elum	Lake Cle Elum	436.9	137.9	375.2	296.8	274.6
Bumping	Bumping Lake	33.7	3.3	32.7	14.1	14.9
Tieton	Rimrock Lake	198.0	102.3	194.9	142.2	129.9
<u>PUGET SOUND</u>						
Skagit	Ross Reservoir	1202.9	805.0	1149.1	745.3	285.4
Skagit	Diablo Reservoir	90.6	84.1	85.0	83.2	82.4
Skagit	Gorge Reservoir	9.8	7.1	7.7	8.4	--

1/ Based on Active Storage.

2/ Less than 15-year record in period 1943-57.

\* 15-year average 1943-57.



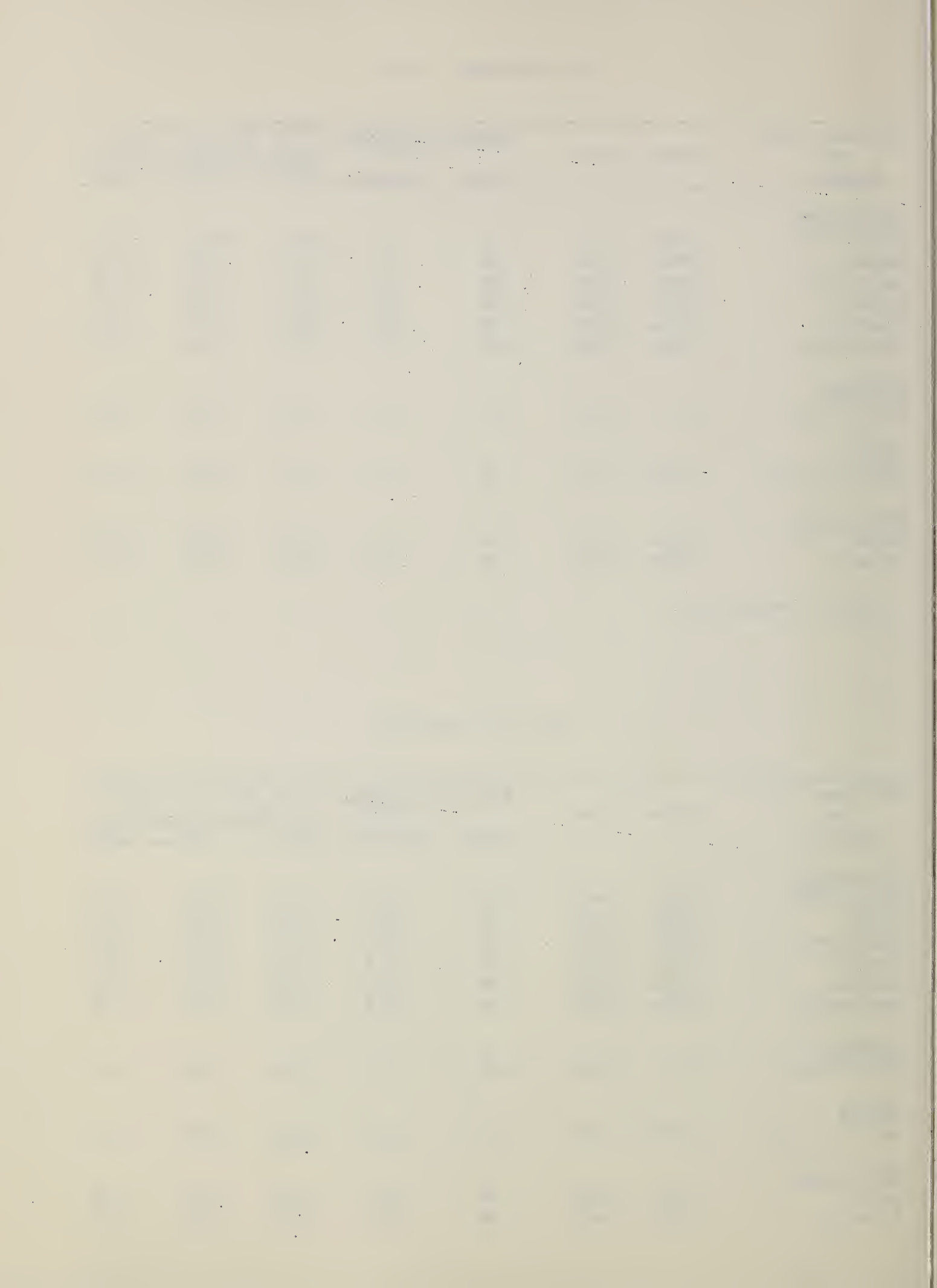
# SOIL MOISTURE - APRIL

Drainage Basin and Station	Number	Elev.	Profile (Inches)		Soil Moisture Content		
			Depth	Total Capacity	:(Inches) as of April 1		
					1964	1963	1962
<u>CRAB CREEK</u>							
Creston-Kunz	18B1m	2440	48	13.6	10.89	10.55	11.09
Govan	18B2m	2100	48	13.6	10.59	11.81	12.27
Jack Woods	18B3m	2600	48	13.6	9.54	9.48	10.74
Krause	18B4m	2440	48	13.6	10.02	9.66	8.74
Sheffels	18B5m	2360	48	13.6	6.32	7.77	6.72
Wheatridge	18B6m	2200	48	13.6	7.79	8.58	7.66
<u>OKANOGAN</u>							
Trout Creek	3-M	3600	48	7.3	3.25*	2.82*	3.12*
<u>YAKIMA</u>							
Lake Cle Elum	21B14M	2200	48	12.8	9.15	12.65	13.25
<u>WALLA WALLA</u>							
Couse	17C3m	3650	48	11.1	9.27	9.19	10.29
Helmers	17C2M	4400	48	12.0	9.25	11.56	11.40

\* March 1 measurement.

# FALL SOIL MOISTURE

Drainage Basin and Station	Number	Elev.	Profile (Inches)		Soil Moisture Content		
			Total	Capacity	:(Inches) as of Oct. 1		
					1963	1962	1961
<u>CRAB CREEK</u>							
Creston-Kunz	18B1m	2440	48	13.6	5.13	9.40	4.25
Govan	18B2m	2100	48	13.6	5.79	9.95	5.60
Jack Woods	18B3m	2600	48	13.6	6.75	7.06	7.35
Krause	18B4m	2440	48	13.6	5.23	9.47	4.99
Sheffels	18B5m	2360	48	13.6	3.69	6.69	3.67
Wheatridge	18B6m	2200	48	13.6	4.50	7.49	4.09
<u>OKANOGAN</u>							
Trout Creek	3-M	3600	48	7.3	3.23	2.80	3.00
<u>YAKIMA</u>							
Lake Cle Elum	21B14M	2200	48	12.8	6.63	6.80	9.50
<u>WALLA WALLA</u>							
Couse	17C3m	3650	48	11.1	5.73	7.20	6.60
Helmers	17C2M	4400	48	12.0	5.75	7.60	6.90



# PRECIPITATION 1/

## Division Averages and Departures

DRAINAGE DIVISIONS	FALL		WINTER		SPRING	
	Sept-Nov. 1963	<u>2/</u>	Dec.'63-Feb.'64	<u>2/</u>	March 1964	<u>2/</u>
	Observed-Departure		Observed-Departure		Observed-Departure	
Columbia in Canada	6.79	+ 1.02	6.92	- 1.36	1.57	+ 0.13
Pend Oreille - Spokane	8.05	- 0.78	9.06	- 2.42	3.65	+ 0.75
Northeastern Washington	5.33	+ 0.11	5.75	- 0.72	1.72	+ 0.13
Southeastern Washington	5.60	- 0.30	6.92	- 0.62	1.78	+ 0.27
Central Washington	9.93	- 3.16	16.54	- 4.89	3.50	- 0.86
North Central Washington	3.40	+ 0.21	4.19	- 0.31	0.74	- 0.19
Northwest Slope Cascades	26.46	+ 3.93	31.34	- 0.36	11.02	+ 3.04
Southwest Slope Cascades	16.24	+ 0.57	24.80	+ 0.09	6.57	+ 0.56
Blue Mountains, Oregon	5.02	+ 0.23	5.87	- 1.60	1.94	- 0.01
Lower Columbia in Oregon	4.76	- 0.58	5.61	- 2.38	1.21	- 0.60

Northeastern Washington - Lower Spokane, Colville, Sanpoil and Lower Kettle Drainages.

Southeastern Washington - Touchet, Tucannon and Palouse Drainages.

Central Washington - Yakima, Wenatchee and Chelan Drainages.

North Central Washington - Methow and Okanogan Drainages.

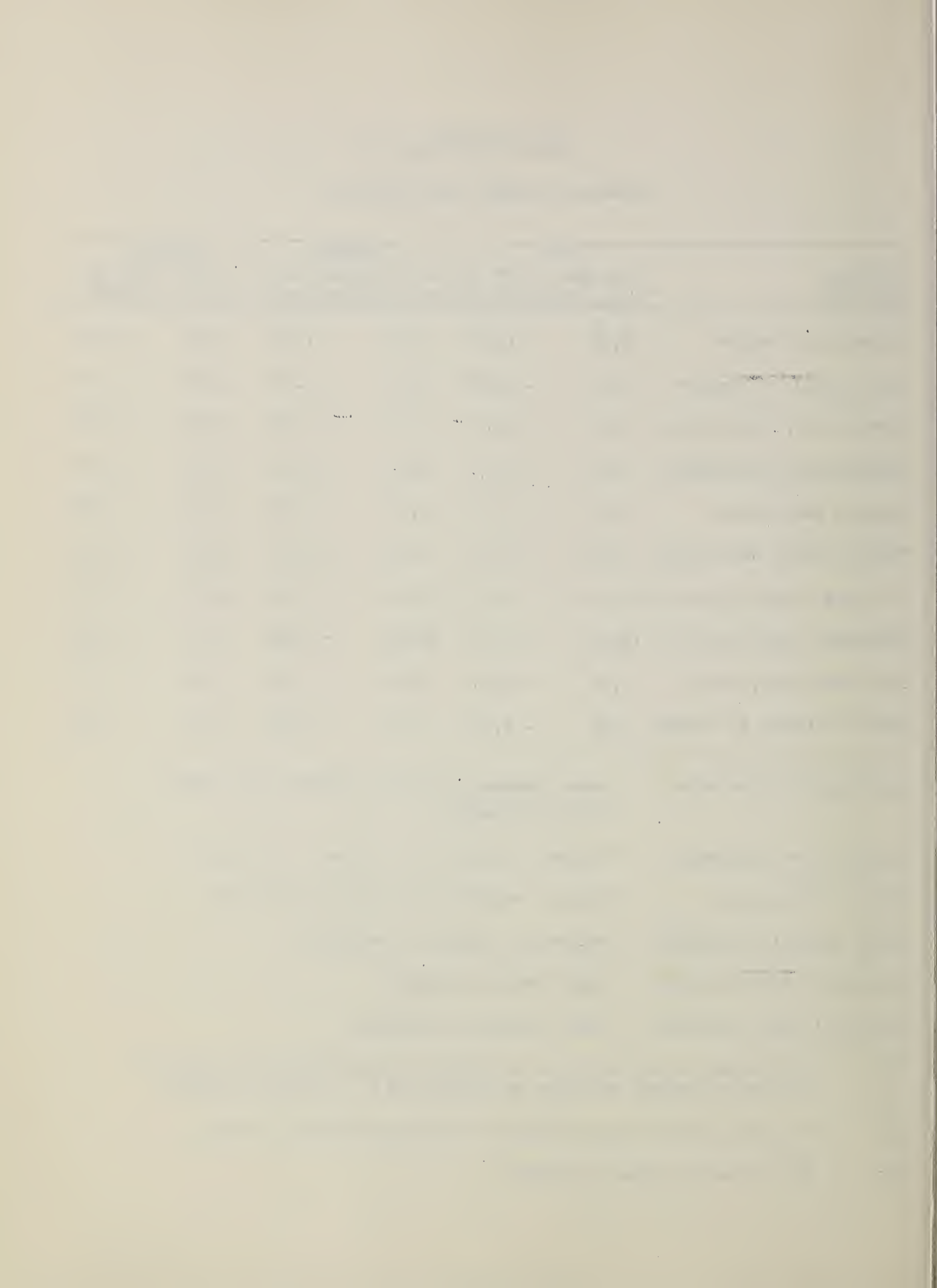
Northwest Slope Cascades - Puget Sound Drainages.

Southwest Slope Cascades - Lower Columbia Drainages.

1/ - Preliminary analysis by U. S. Weather Bureau from data furnished by Meteorological Services of Canada and U. S. Weather Bureau.

2/ - Departure from 15-year (1943-57) drainage division average.

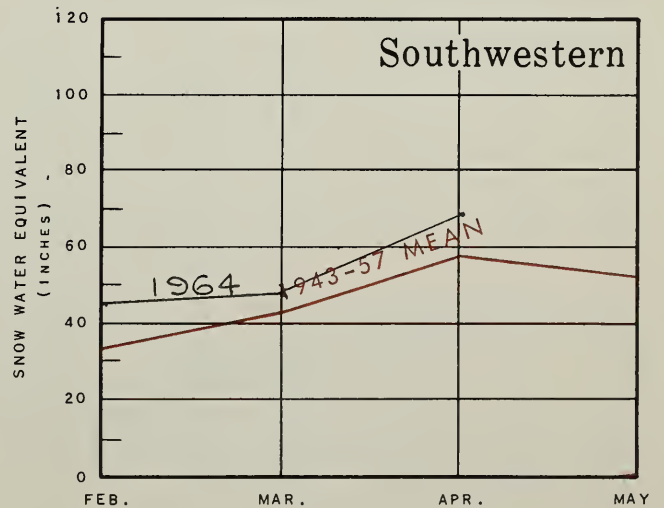
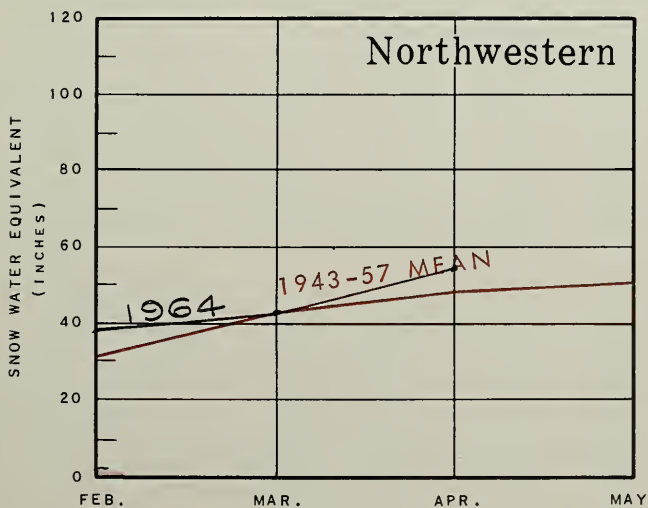
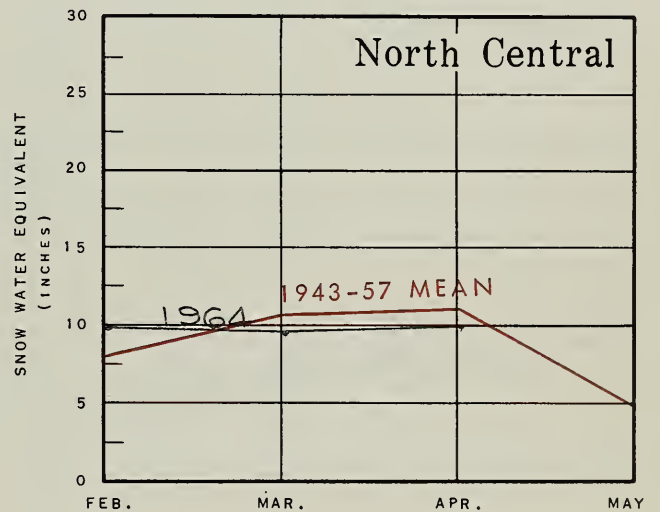
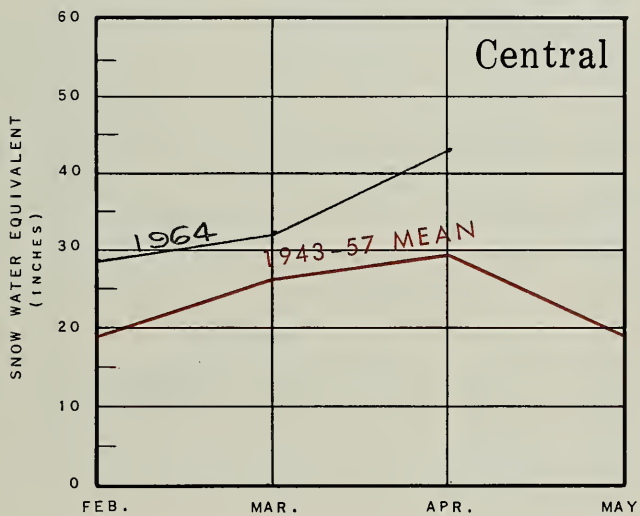
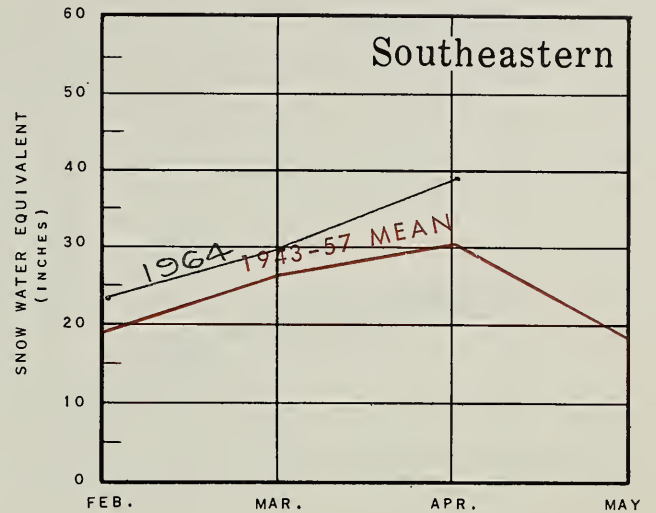
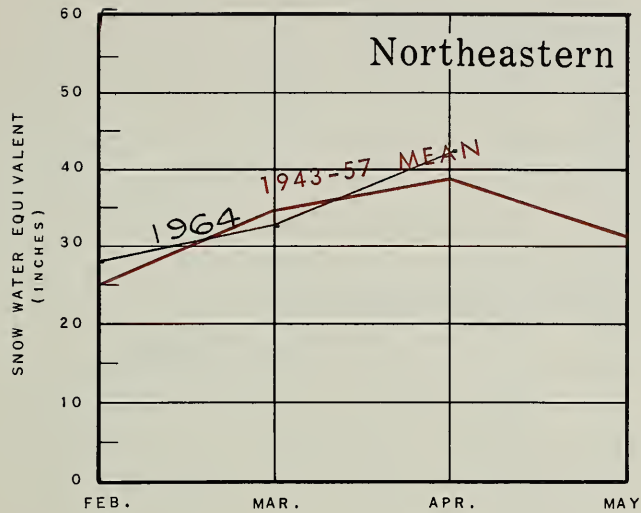
Note - Precipitation shown in inches.



# WASHINGTON SNOW COVER

1964

## DRAINAGE AREAS

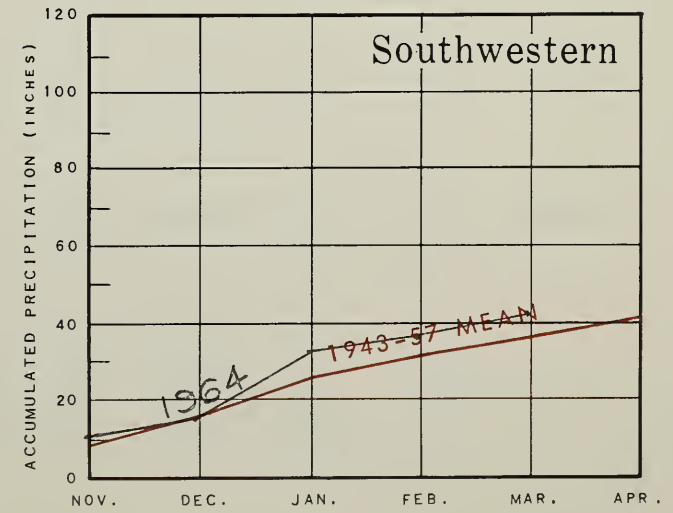
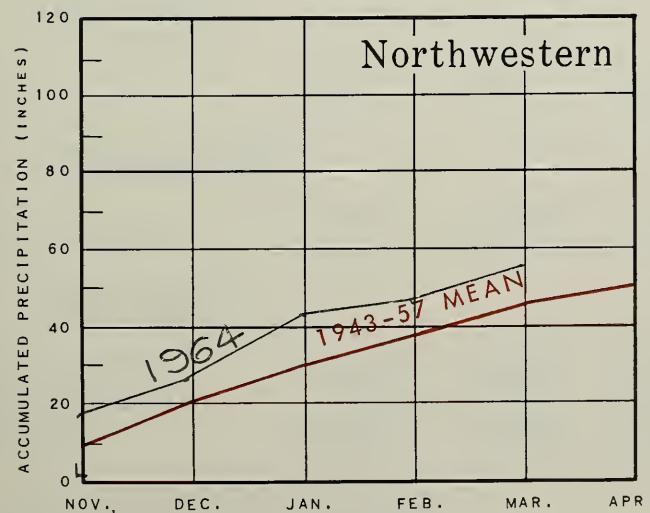
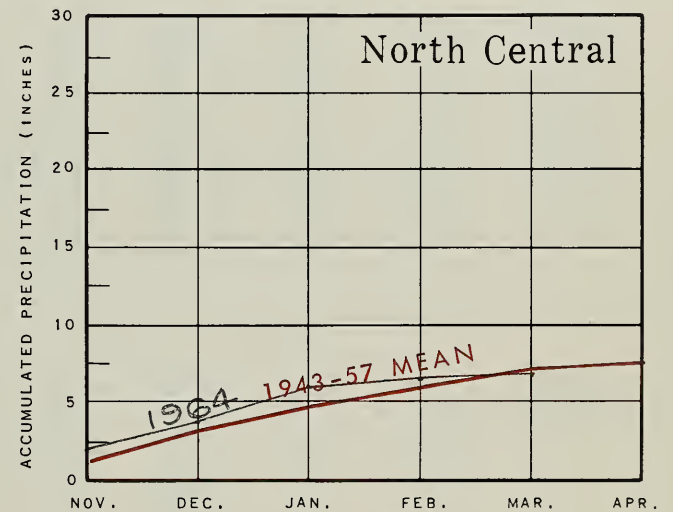
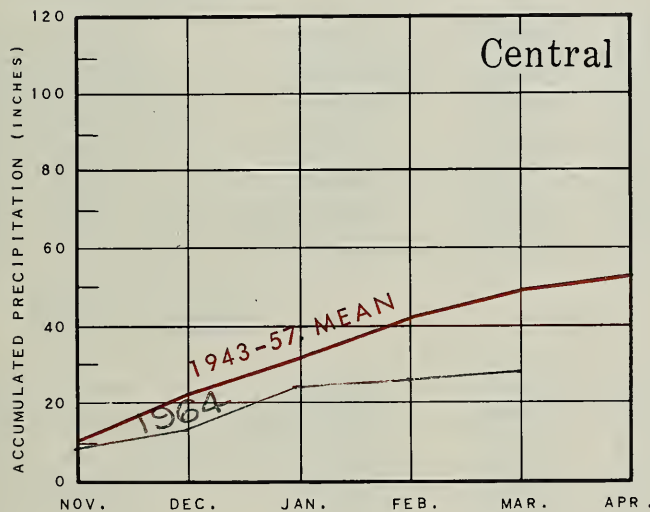
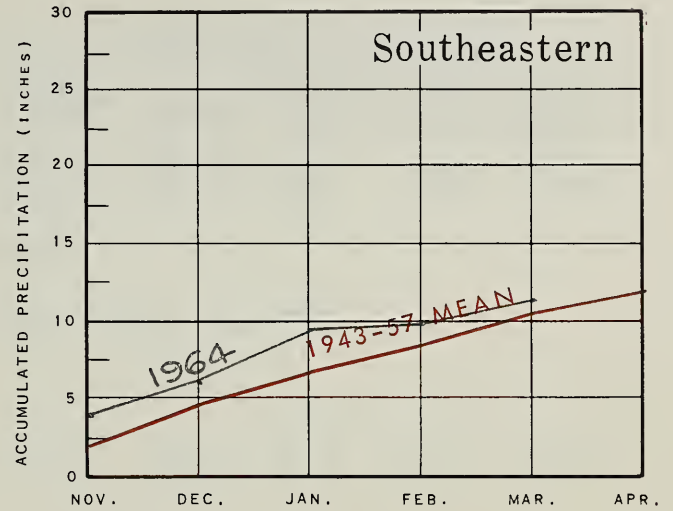
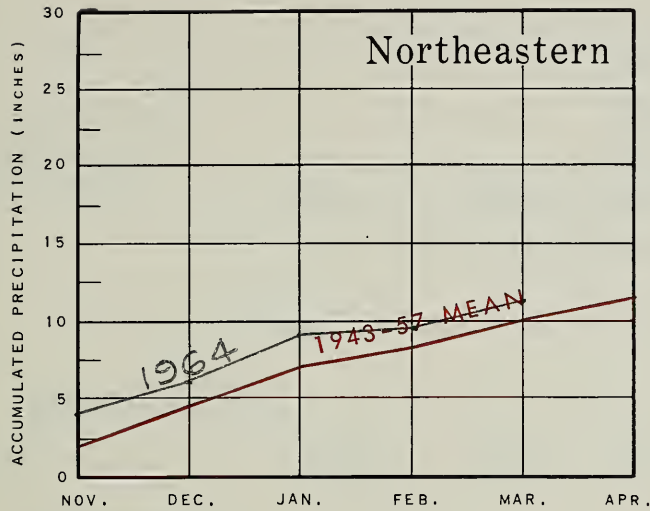


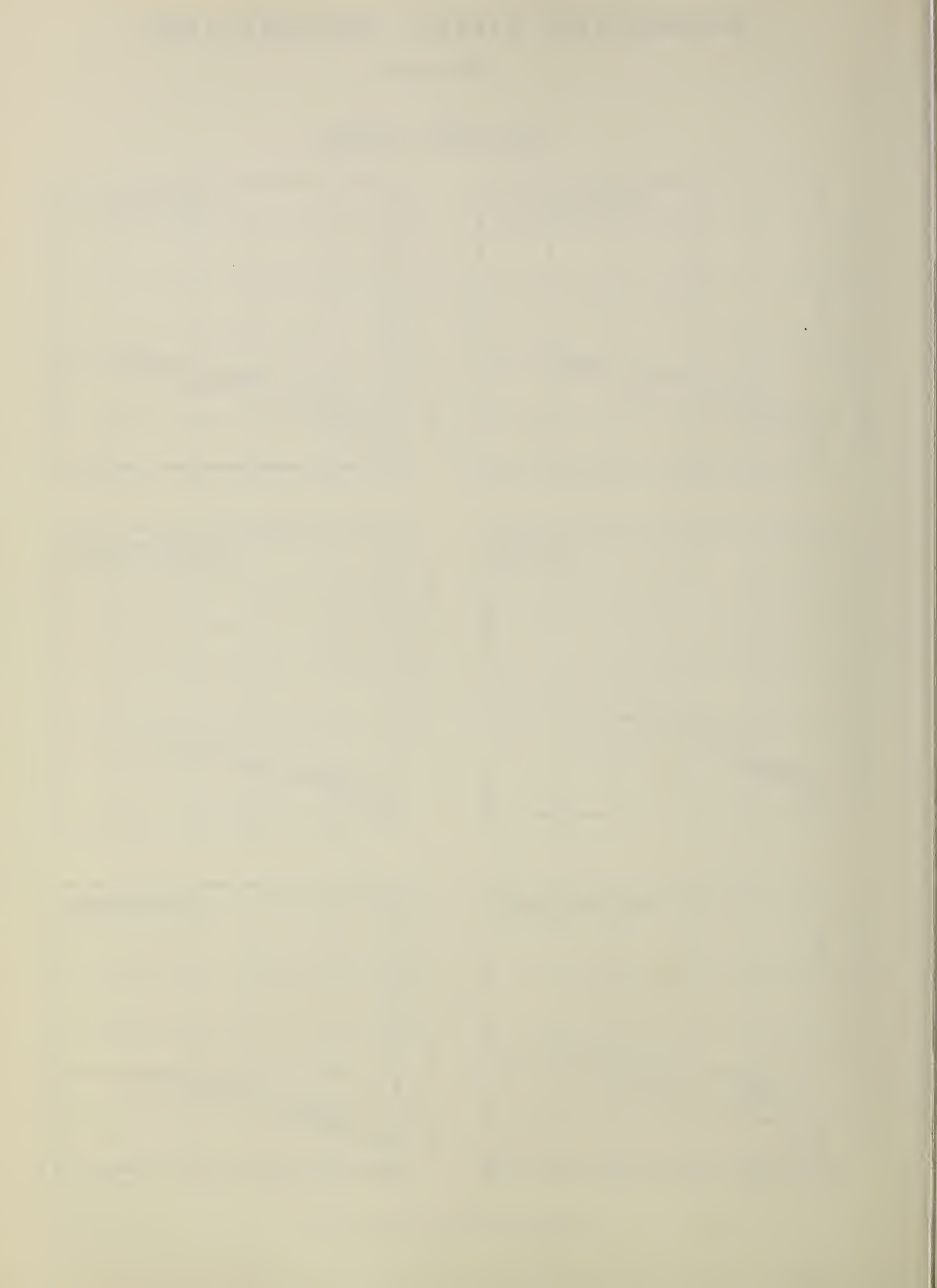


# WASHINGTON VALLEY PRECIPITATION

1963 - 1964

## DRAINAGE AREAS





## APPENDIX 1

SNOW DATA APRIL 1, 1964

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1964		: P a s t   R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content (In.)	1943-57 Avg.	

## MID-MONTH SURVEYS

Snow Surveys made on or about March 15, 1964

WENATCHEE RIVER

Stevens Pass	21B1	4070	3/14	186	69.8	19.5	43.1	48.2*
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YAKIMA RIVER

Bumping Lake	21C8	3450	3/14	62	18.2	4.3	13.0	19.6*
Lake Cle Elum	21B14M	2200	3/15	35	14.1	0.0	0.0	12.4*
#Stampede Pass	21B10	3000	3/13	212	53.6	19.4	33.6	50.2*
Tunnel Avenue	21B8	2450	3/14	101	40.4	6.2	17.9	28.0*
White Pass	21C9	4500	3/16	125	49.4	14.0	26.6	37.8*
White Pass (Ea. Side)	21C28	4500	3/13	89	28.9	9.4	17.4	32.0*
White Pass (Leech Lk.)	21C27	4500	3/16	106	40.0	11.0	23.8	--

COWLITZ RIVER

#White Pass	21C9	4500	3/16	125	49.4	14.0	26.6	37.8*
#White Pass (Ea. Side)	21C28	4500	3/13	89	28.9	9.4	17.4	32.0*
#White Pass (Leech Lk.)	21C27	4500	3/16	106	40.0	11.0	23.8	--
Ohanapecosh	21C32	2200	3/16	63	23.2	--	--	--
Pigtail Peak	21C33	5900	3/16	208	88.0	--	--	--

GREEN RIVER

Stampede Pass	21B10	3000	3/13	212	53.6	19.4	33.6	50.2*
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SKYKOMISH RIVER

#Stevens Pass	21B1	4070	3/14	186	69.8	19.5	43.1	48.2*
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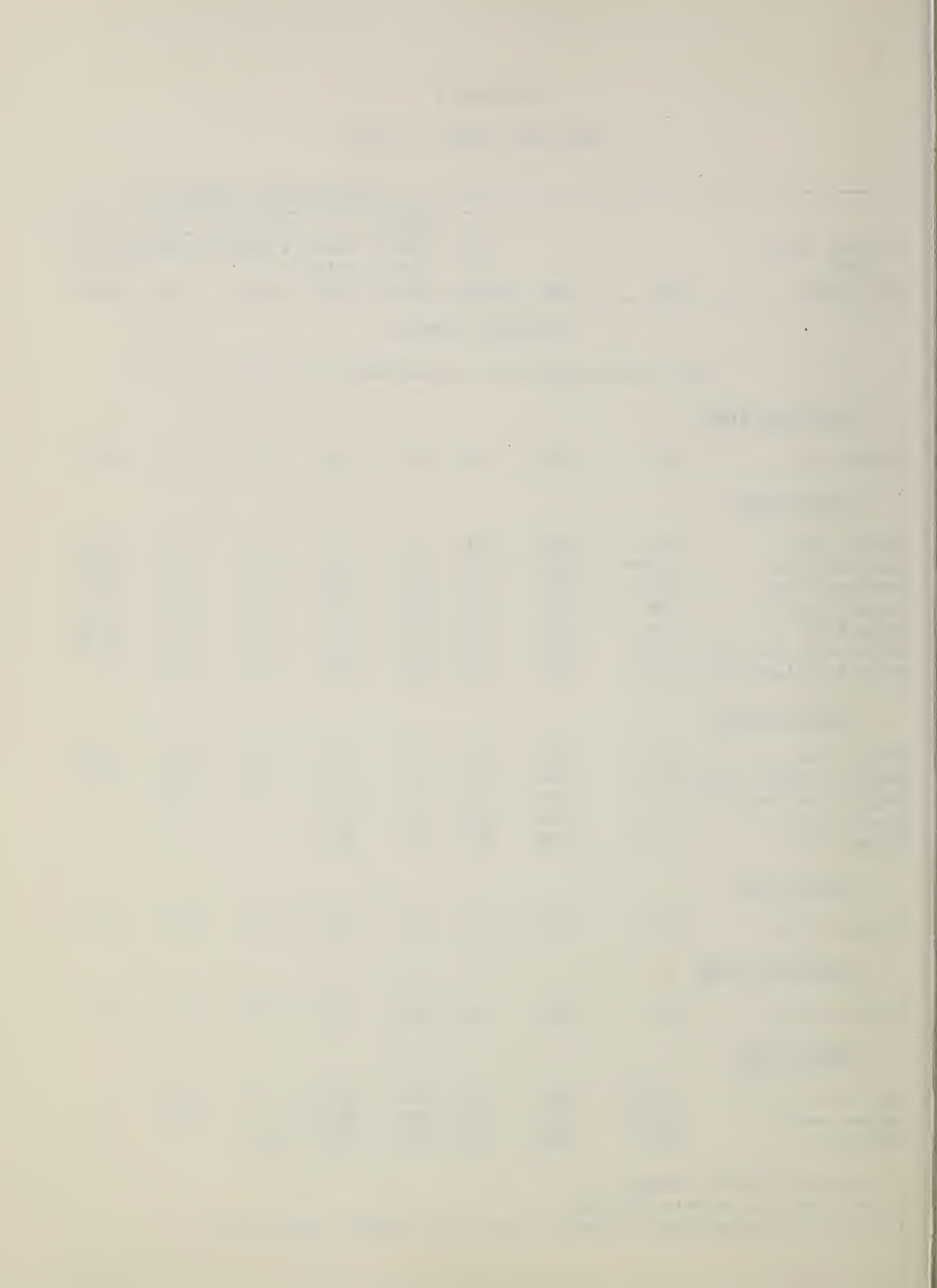
BAKER RIVER

Dock Butte +	21A11A	3800	3/15	246	93.5	--	63.4	--
Marten Lake +	21A9A	3600	3/15	252	95.8	--	64.8	--
#Panorama	21A5	4300	3/12	247	93.0	42.2	--	--

\* Adjusted 1943-57 average

# Not directly on this drainage

1/ Snow water equivalent estimated from aerial stadia observations



# APPENDIX 2

				SNOW COVER MEASUREMENT				
				1964	: P a s t R e c o r d			
DRAINAGE BASIN			Date	Snow	Water	: Water Content (In.)		
and			of	Depth	Content:	1943-57		
SNOW COURSE	No.	Elev.	Survey	(In.)	(In.)	:1963	1962	Avg.

Snow Surveys made on or about March 15, 1964 (Cont'd)

## BAKER RIVER (Cont'd)

Rocky Creek +	21A12A	2100	3/15	123	44.3	1.4	20.8	--
Schreibers Meadow +	21A10A	3400	3/15	210	79.8	--	50.4	--
S.F. Thunder Cr. +	21A14A	2200	3/15	40	14.4	0.0	3.5	--
Watson Lakes +	21A8A	4500	3/15	225	85.5	--	50.8	--

## NOOKSACK RIVER

Panorama	21A5	4300	3/12	247	93.0	42.2	--	--
----------	------	------	------	-----	------	------	----	----

\* Adjusted 1943-57 average

1/ Snow water equivalent estimated from aerial stadia observations



## APPENDIX 3

SNOW DATA APRIL 1, 1964

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			Date of Survey	1964		: P a s t   R e c o r d		
				Snow Depth (In.)	Water Content: (In.)	Water Content: (In.)	1943-57 Avg.	

U P P E R   C O L U M B I A   D R A I N A G EP E N D O R E I L L E   R I V E R

Baree Creek	15B11	5500	3/31	137	56.3	31.7	51.2	48.7*
Benton Meadow	16A2	2344	3/31	24	7.9	0.0	4.3	3.0
Benton Spring	16A3	4900	3/30	65	24.0	8.8	21.4	22.9
Boyer Mountain	17A2	5250	3/27	89	32.4	17.6	32.4	28.4*
Brush Creek	14A4	5000	4/1	39	13.4	6.8	10.7	15.2*
Bunchgrass Meadow	17A1	5000	3/30	90	34.4	18.0	32.3	30.9
#Chewelah	17A4	4925	3/28	66	22.8	9.2	22.7	--
Hoodoo Creek	15C1	6200	4/2	124	49.8	32.8	50.7	53.2
Lookout	15B2	5250	3/30	113	41.6	24.1	42.8	39.3*
Mosquito Ridge +	16A4A	5100	3/30	125	48.1	25.0	41.8	38.3
Nelson	Canada	3050	3/31	58	19.4	6.3	16.5	17.3
Schweitzer Bowl	16A6	4500	3/31	89	32.8	New Course		
Schweitzer Ridge	16A5	6100	3/31	137	55.8	New Course		
Smith Creek	16A1	4800	3/29	147	57.7	33.2	46.5	49.6
Winchester Creek	17A3	2970	3/28	44	15.9	1.0	16.4	--

K E T T L E   R I V E R

Barnes Creek	Canada	5300	3/31	64	22.9	17.5	21.8	20.4**
Boulder Road	18A2	1450	3/27	13	4.9	0.0	3.5	--
Butte Creek	18A3	4070	3/27	33	9.6	2.4	14.0	--
Cabin Creek	18A8	3170	3/27	28	8.8	1.5	12.5	--
Carmi	Canada	4100	4/1	26	7.7	1.7	--	--
Farron	Canada	4000	3/30	44	14.7	5.8	16.2	14.0
Goat Creek	18A4	3595	3/27	22	7.6	0.0	10.5	--
Monashee Pass	Canada	4500	3/31	47	17.3	11.5	15.7	13.2**
Snow Caps Creek	18A5	2150	3/27	14	4.5	0.0	4.0	--
Snow Caps Trail	18A6	2720	3/27	20	6.7	0.0	8.5	--
Summit G. S.	18A7	4600	3/27	32	8.8	3.2	12.6	--

C O L V I L L E   R I V E R

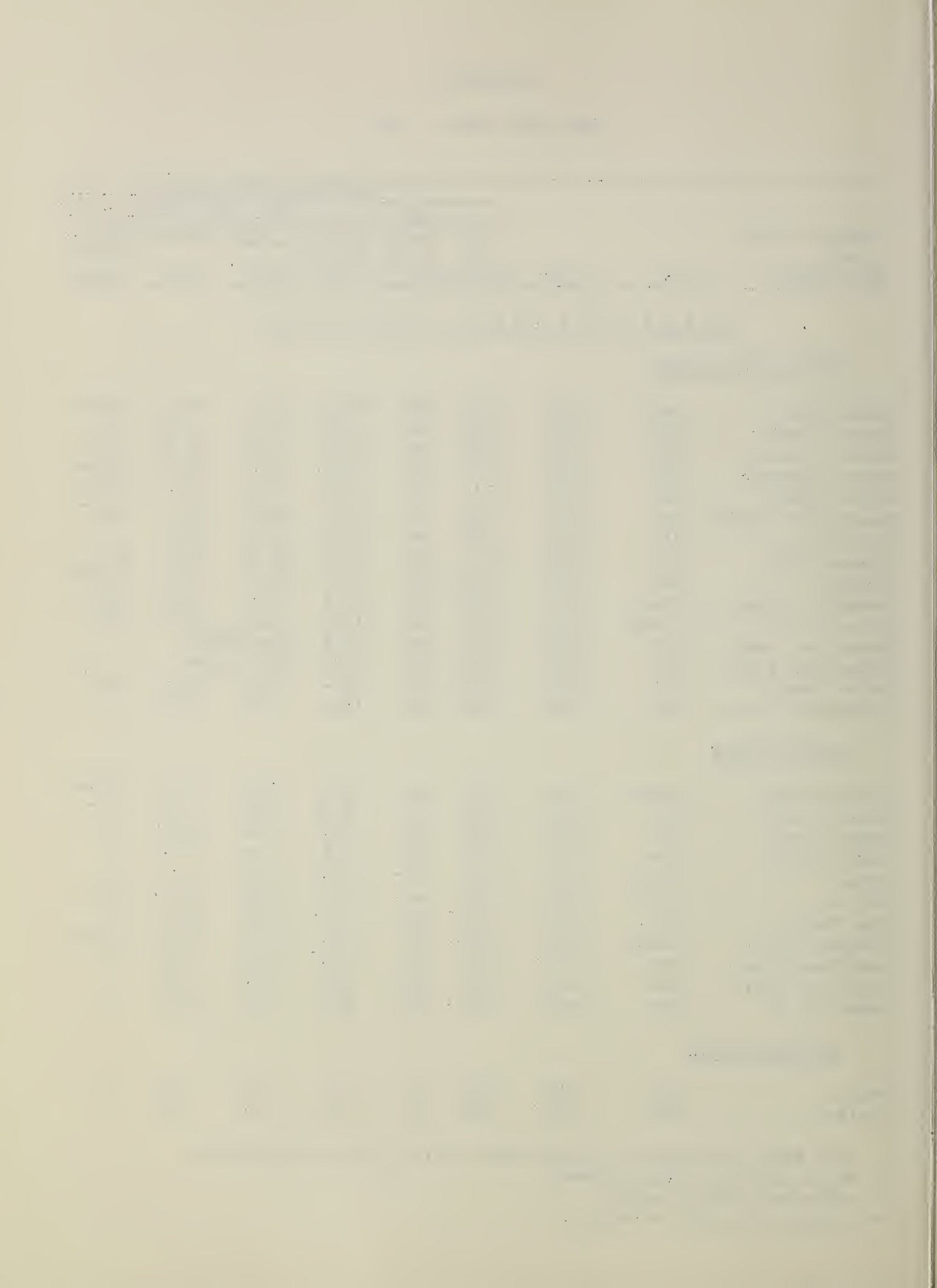
Baird	17A6	3215	3/25	36	11.4	0.0	7.0	--
Carlson	18A9	2835	3/31	18	5.7	0.0	2.2	--

+ Snow water equivalent estimated from aerial stadia observations

# Not directly on this drainage

\* Adjusted 1943-57 average

\*\* Average for years of record



## APPENDIX 4

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			Date of Survey	1964		: P a s t   R e c o r d		
				Snow Depth (In.)	Water Content: (In.)	Water : 1963	Water Content (In.) 1962	1943-57 Avg.

COLVILLE RIVER (Cont'd)

Chewelah	17A4	4925	3/28	66	22.8	9.2	22.7	--
Stranger Mountain	17A5	4990	3/31	52	18.2	4.1	17.3	--
Togo	18A10	3370	3/30	47	16.4	1.4	13.3	--

SPOKANE RIVER

Above Burke	15B8	4100	3/17	93	30.5	13.1	27.8	21.0
Above Roland	15B7	4350	3/16	114	38.7	16.9	32.5	29.8
Below Roland	15B6	3770	Not Measured			6.7	19.0	14.4
Copper Ridge	16B2	4800	3/31	105	44.3	12.0	34.4	32.8
Forty-nine Meadows	15B3	5000	3/30	103	40.6	24.2	36.0	39.6
4th of July Summit	16B3	3100	3/30	46	16.8	0.0	13.1	11.2
Granite Peak +	15B13A	6000	3/30	125	49.6	--	--	--
Kellogg Peak +	16B5A	5560	3/30	106	38.4	13.4	30.9	31.2
#Lookout	15B2	5250	3/30	113	41.6	24.1	42.8	39.0*
Lower Sands Creek	16B1	3400	3/31	78	30.4	8.6	22.8	21.4*
Medicine Ridge +	15B4A	6150	3/30	124	49.1	--	--	--
Mosquito Ridge +	16A4A	5110	3/30	125	48.1	25.0	41.8	38.3
Outlaw	15B12	3750	3/30	62	21.9	13.7	18.2	--
Roland Summit +	15B5A	5200	3/30	114	41.6	20.7	39.5	38.5
Sherwin	16C1	3200	3/27	66	23.0	3.6	16.6	15.2
Sunset +	15B9A	5600	3/30	122	42.3	23.8	35.6	31.9

SANPOIL RIVER

Sherman Creek Pass	18A1	5350	3/26	51	14.8	7.1	15.2	14.8
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OKANOGAN RIVER

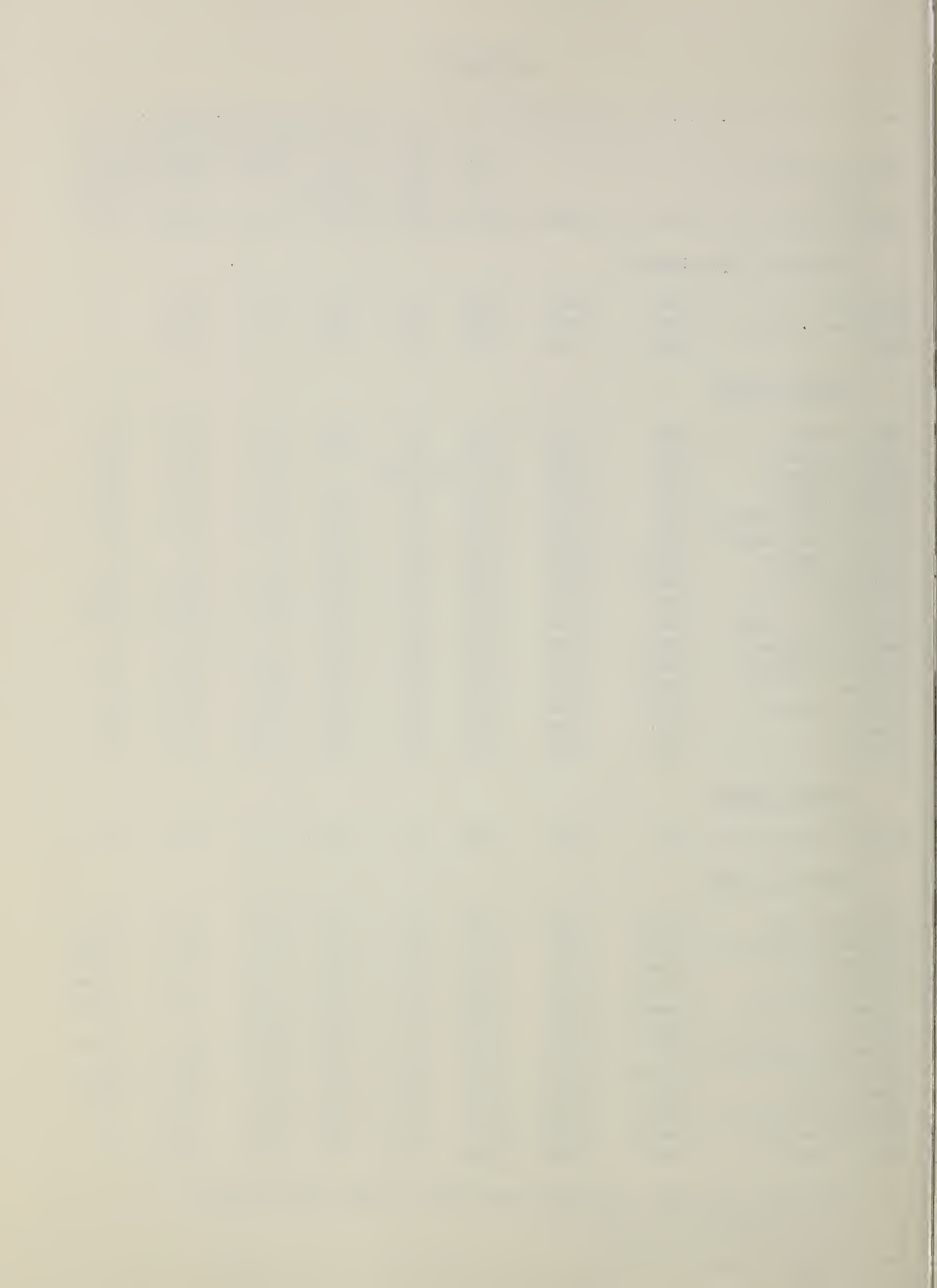
Aberdeen Lake	Canada	4300	3/30	23	7.2	2.2	9.1	6.8
Blackwall Mountain	Canada	6250	4/1	100	42.7	22.2	21.2	29.6**
Bouleau Creek	Canada	5000	3/27	48	13.7	5.6	13.6	11.8**
Brookmere	Canada	3200	3/31	33	10.8	4.7	7.6	9.6**
Copper Mountain	Canada	4300	3/29	20	7.0	0.0	4.4	6.0**
Clark +	19A8a	7000	3/30	72	20.2	14.0	--	--
#Freezeout Meadows	20A2	5000	3/24	96	34.8	16.1	22.3	36.0*
Hamilton Hill	Canada	4900	3/30	50	18.1	10.0	14.5	--
#Harts Pass	20A5A	6500	3/27	129	51.1	33.4	35.5	48.2*
#Horseshoe Basin +	19A5a	7000	3/27	35	13.6	11.6	6.4	--
Lost Horse Mtn.	Canada	6300	4/1	37	11.4	6.0	9.6	--
#Loup Loup	19A7	4650	3/30	27	7.7	2.2	6.0	--

+ Snow water equivalent estimated from aerial stadia observations

# Not directly on this drainage

\* Adjusted 1943-57 average

\*\* Average for years of record



## APPENDIX 5

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1964		: P a s t   R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content (In.)	1943-57 Avg.	

OKANOGAN RIVER Cont'd)

McCulloch	Canada	4200	4/1	27	8.9	3.4	9.3	7.2
Missezula Mountain	Canada	5100	4/1	34	10.7	5.4	7.3	--
Mission Creek	Canada	6000	3/27	73	22.7	14.7	20.9	20.8
Monashee Pass	Canada	4500	3/31	47	17.3	11.5	15.7	13.2**
Muckamuck +	19A9a	6390	3/30	48	13.4	10.9	--	--
Mutton Creek No. 1	19A1	5700	3/30	42	12.0	5.5	6.0	14.6
Mutton Creek No. 2	19A4	6000	3/30	45	12.2	8.5	9.8	15.4*
New Copper Mountain	Canada	4300	3/28	21	6.9	0.0	3.8	4.0**
Nickel Plate Mtn.	Canada	6200	4/2	41	13.2	4.8	10.2	7.2**
Paysayten +	20A28a	4300	3/27	60	23.4	14.7	6.1	--
Penticton Reservoir	Canada	5300	3/31	45	13.2	4.5	7.6	8.1**
Postill Lake	Canada	4500	3/30	31	9.2	4.3	10.2	8.8**
#Quartette Lake	Canada	4000	3/28	57	18.1	9.8	9.5	15.2**
Rusty Creek	19A3	4000	3/31	18	5.0	2.0	5.6	7.3*
Salmon Meadows	19A2	4500	3/30	35	9.8	5.2	7.6	11.1
Silver Star Mtn.	Canada	6050	3/27	89	31.6	17.5	18.4	20.0**
Starvation Mtn. +	19A10a	6750	3/30	72	20.2	15.4	--	--
Summerland Res.	Canada	4200	3/27	45	12.3	4.4	8.8	9.2
Touts Coulee	19A6	2845	3/25	9	2.8	0.0	0.0	--
Trout Creek	Canada	4700	4/1	27	7.5	3.8	7.5	8.0
White Rocks Mtn.	Canada	6000	4/1	68	23.4	13.2	19.7	17.6**

METHOW RIVER

Billy Goat Pass +	20A10a	6400	3/27	96	37.4	32.6	13.4	--
Dollar Watch +	20A29a	7000	3/27	93	36.3	27.3	11.5	--
Harts Pass	20A5A	6500	3/27	129	51.1	33.4	35.5	48.2*
Horseshoe Basin +	19A5a	7000	3/27	35	13.6	11.6	6.4	--
Loup Loup	19A7	4650	3/30	27	7.7	2.2	6.0	--
#Mutton Creek No. 1	19A1	5700	3/30	42	12.0	5.5	6.0	14.6*
#Mutton Creek No. 2	19A4	6000	3/30	45	12.2	8.5	9.8	15.4*
#Rusty Creek	19A3	4000	3/31	18	5.0	2.0	5.6	7.3*
#Salmon Meadows	19A2	4500	3/30	35	9.8	5.2	7.6	11.1

CHELAN LAKE BASIN

Lyman Lake	20A23A	5900	3/29	165	66.2	33.6	40.6	61.3
Park Creek Ridge	20A12A	4600	3/29	144	57.3	25.3	36.0	48.0
Rainy Pass	20A9	4780	3/29	127	48.0	25.5	32.9	42.5
Safety Harbor	20A30	6300	3/29	76	27.8	18.7	--	--

+ Snow water equivalent estimated from aerial stadia observations

# Not directly on this drainage

\* Adjusted 1943-57 average

\*\* Average for years of record



# APPENDIX 6

			SNOW COVER MEASUREMENT					
			1964	: P a s t   R e c o r d				
DRAINAGE BASIN and SNOW COURSE	No.	Elev.	Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content: (In.)	Water Content (In.)	1943-57 Avg.
<u>ENTIAT RIVER</u>								
Brief	20B19	1600	3/26	12	5.3	0.0	0.0	--
<u>WENATCHEE RIVER</u>								
Berne-Mill Creek	21B23	2925	3/30	93	38.1	2.1	24.3	--
Blewett Pass No. 2	20B2	4270	3/30	57	20.0	1.4	15.7	18.8*
Chiwaukum G. S.	20B16	1810	3/30	27	10.1	0.0	9.0	--
#Fish Lake	21B4	3371	3/27	110	41.2	12.5	33.2	38.7
Lake Wenatchee	20B5	1970	3/30	40	15.4	0.0	10.3	--
Leavenworth R. S.	20B17	1127	3/26	1	0.4	0.0	0.0	--
#Lyman Lake	20A23A	5900	3/29	165	66.2	33.6	40.6	61.3
Merritt	20B18	2140	3/30	50	20.3	0.0	10.6	--
Stevens Pass	21B1	4070	3/30	179	78.5	26.2	47.0	54.3*
<u>SQUILCHUCK CREEK</u>								
Beehive Springs	20B3	4400	3/24	28	8.6	0.0	8.3	9.0*
Scout-A-Vista	20B4	3400	3/24	26	8.5	0.0	7.7	7.6*
<u>STEMILT CREEK</u>								
Jump-Off	20B8	4450	3/24	27	8.4	0.0	7.6	--
Stemilt Slide	20B6	5000	3/24	44	13.2	0.0	12.5	--
Upper Wheeler	20B7	4400	3/24	35	11.9	0.0	10.3	--
<u>YAKIMA RIVER</u>								
Ahtanum R. S.	21C11	3100	3/26	13	4.5	3.0	6.7	6.4*
Big Boulder Creek	21B9	3200	3/27	68	26.0	0.7	13.6	23.4
#Blewett Pass No. 2	20B2	4270	3/30	57	20.0	1.4	15.7	18.8*
Bumping Lake	21C8	3450	3/30	52	19.8	3.4	13.4	19.4
#Cayuse Pass	21C6	5300	3/31	241	113.4	54.2	78.0	97.5
Clockum Pass	20B9	5370	3/31	46	16.1	9.6	16.4	--
Cooke Creek	20B10	4123	3/31	19	6.3	0.0	7.2	--
#Corral Pass	21B13	6000	3/26	142	52.5	22.1	38.7	47.3*
Fish Lake	21B4	3371	3/27	110	41.2	12.5	33.2	38.7
Green Lake	21C10	6000	3/25	104	40.3	23.5	37.2	30.9*
Grouse Camp	20B11	5385	3/30	44	15.4	6.9	15.0	--
High Creek	20B12	2930	3/30	14	4.7	0.0	0.0	--

# Not directly on this drainage

\* Adjusted 1943-57 average



# APPENDIX 7

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1964		:P a s t R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content: (In.)	Water Content (In.)	1943-57 Avg.

## YAKIMA RIVER Cont'd)

Lake Cle Elum	21B14M	2200	3/30	24	10.4	0.0	0.0	9.4
Manashtash	20C1	3935	Not Measured			0.0	0.0	--
Morse Lake	21C17	5400	3/27	160	64.3	32.6	51.0	65.6*
Nanum	20B13	3875	3/30	33	10.9	0.0	10.0	--
#Olallie Meadows	21B2	3625	3/30	177	76.8	14.7	41.3	58.6*
#Satus Pass	20D1	4030	3/30	30	11.9	0.2	11.1	--
#Stampede Pass	21B10	3000	3/31	185	58.3	25.1	38.1	53.8*
Trail Creek	20B14	3360	3/31	0	0.0	0.0	0.0	--
Tunnel Avenue	21B8	2450	3/30	85	42.3	3.6	22.7	29.1
Walters Flat	20B15	3360	3/30	22	6.5	0.0	6.2	--
White Pass	21C9	4500	3/30	107	42.8	18.0	30.4	39.1*
White Pass(Ea.Side)	21C28	4500	3/30	82	29.9	9.7	21.7	38.5*
White Pass(Leech Lk)	21C27	4500	3/30	98	38.2	15.2	26.4	--

## AHTANUM CREEK

Ahtanum R. S.	21C11	3100	3/26	13	4.5	3.0	6.7	6.4*
Green Lake	21C10	6000	3/25	104	40.3	23.5	37.2	30.9*

## L O W E R C O L U M B I A D R A I N A G E

### MILL CREEK

Homestead	17C1	4030	3/31	36	12.8	0.0	9.2	--
Martin Springs	17C2	4400	3/31	54	19.6	4.2	17.2	--
Walla Walla Div.	18D13	2400	4/1	0	0.0	0.0	0.0	--

### KLICKITAT RIVER

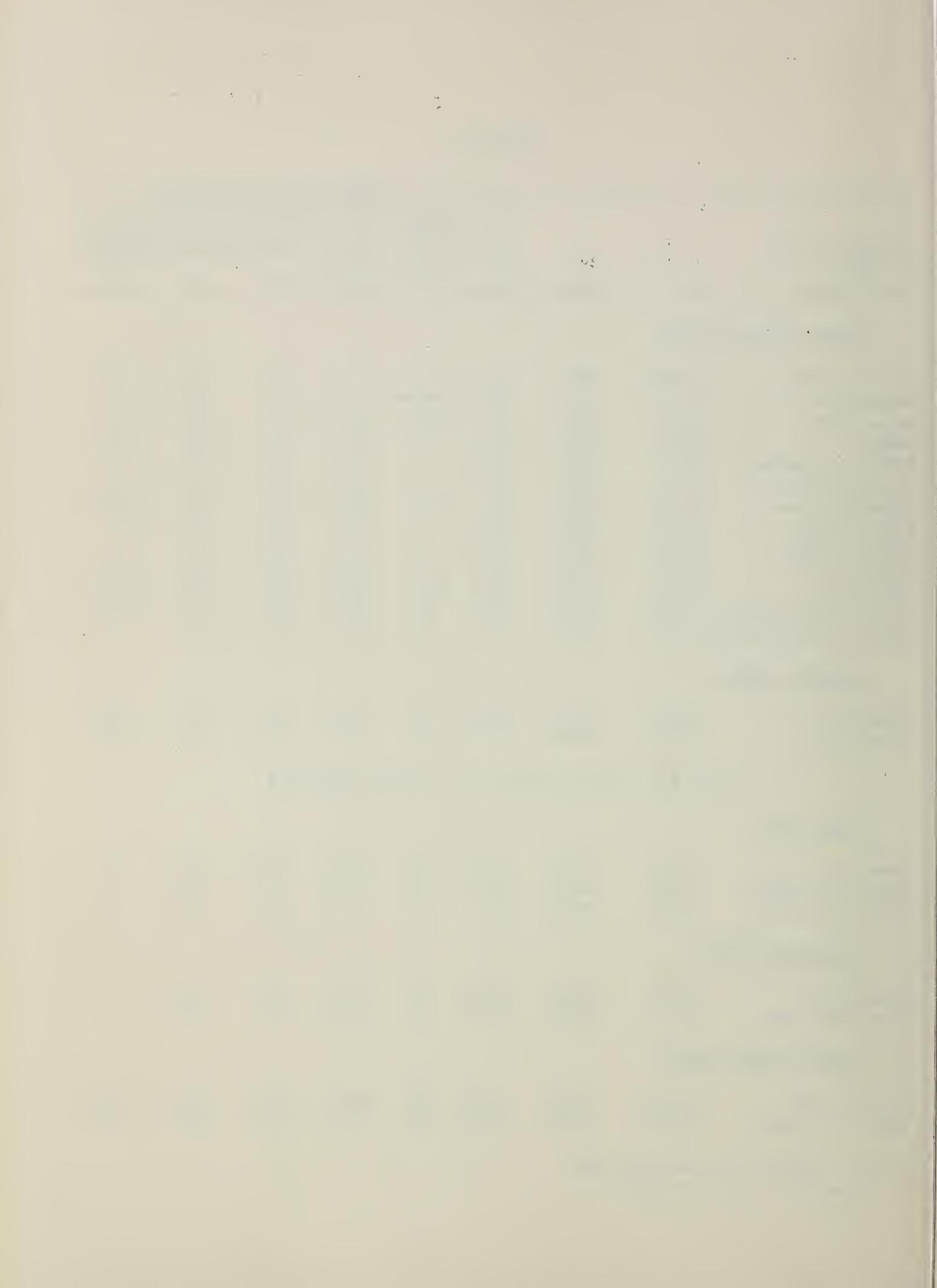
Satus Pass	20D1	4030	3/30	30	11.9	0.2	11.1	--
West Fork Cabin	21C15	3000	3/27	13	5.0	0.0	9.3	--

### WHITE SALMON RIVER

Cultus Creek	21C12	4000	3/26	128	51.2	23.9	47.6	53.6*
#Surprise Lakes	21C13A	4250	3/26	147	68.5	22.9	52.0	58.8*

# Not directly on this drainage

\* Adjusted 1943-57 average



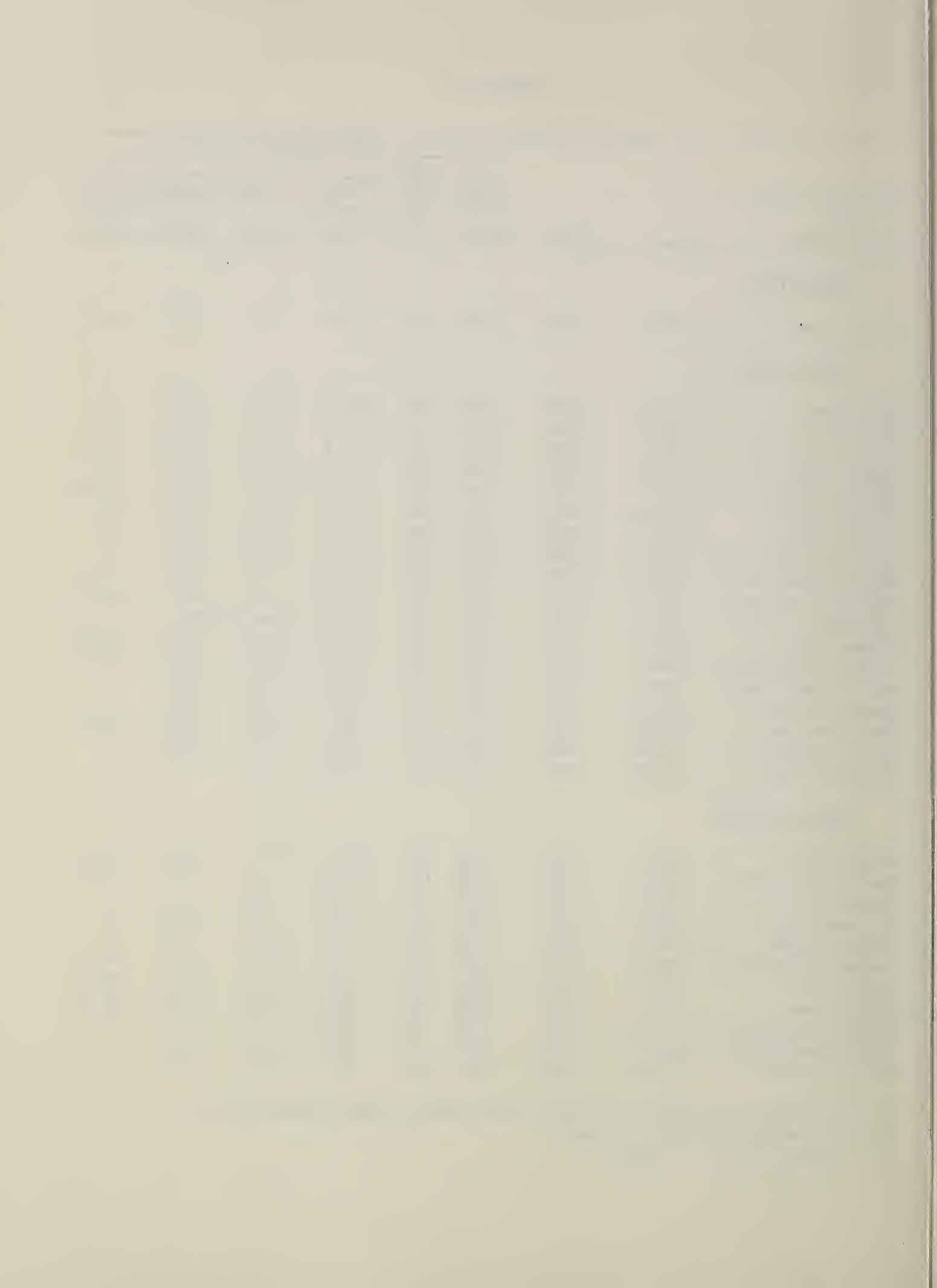
# APPENDIX 8

			SNOW COVER MEASUREMENT					
			1964		: P a s t   R e c o r d			
DRAINAGE BASIN			Date	Snow	Water	: Water Content (In.)		
and			of	Depth	Content:	1943-57		
SNOW COURSE	No.	Elev.	Survey	(In.)	(In.)	:1963	1962	Avg.
<u>WIND RIVER</u>								
Oldman Pass	21D19	3100	3/24	66	26.0	6.6	15.9	20.0*
<u>LEWIS RIVER</u>								
Blue Lake +	21C22a	4800	3/28	235	84.5	44.1	78.0	--
Bob's Trail	21C21	2200	3/26	57	23.5	0.0	11.4	--
Calamity Ridge +	22D1a	2500	3/28	32	9.6	1.6	0.0	--
Council Pass +	21C18a	4200	3/28	138	53.8	17.7	38.5	--
#Cultus Creek	21C12	4000	3/26	128	51.2	23.9	47.6	53.6*
Divide Meadow +	21C29a	5600	3/28	160	60.7	34.6	56.1	--
Grand Meadow	21C25	3500	3/25	106	37.0	7.1	25.1	--
Lone Pine Shelter	21C26	3800	3/26	138	49.8	11.3	34.2	--
Marble Mountain +	22C5a	3200	3/28	125	55.6	9.5	--	--
#Mosquito Meadows	21C19	4100	3/36	142	51.5	--	41.4	49.3*
New Muddy River	22C6	2000	3/27	34	14.8	New Course		
Oldman Pass	21D19	3100	3/24	66	26.0	6.6	15.9	20.0*
Plains of Abraham +	22C1a	4400	3/28	188	75.2	34.7	65.4	76.5*
Smith Creek Road	22C4	2100	3/27	35	14.8	0.0	15.8	--
Spencer Meadow +	21C20a	3400	3/28	85	37.4	7.4	19.9	--
Surprise Lakes	21C13A	4250	3/26	147	68.5	22.9	52.0	58.8*
Table Mountain +	21C24a	4200	3/28	145	56.5	23.4	50.5	--
Timbered Peak +	21D18a	3000	3/28	81	28.4	7.4	7.2	--
<u>COWLITZ RIVER</u>								
Cayuse Pass	21C6	5300	3/31	241	113.4	54.2	78.0	97.5
Mosquito Meadows	21C19	4100	3/26	142	51.6	--	41.4	49.3*
Ohanapecosh	21C32	2200	3/25	55	20.4	2.5	--	--
Packwood Lake	21C31	2870	3/25	59	18.6	1.0	10.8	--
Pigtail Peak	21C33	5900	3/30	201	91.2	40.0	--	--
Plains of Abraham +	22C1a	4400	3/28	188	75.2	34.7	65.4	76.5*
Potato Hill	21C14	4500	3/27	99	38.1	7.5	30.5	36.5*
#White Pass	21C9	4500	3/30	107	42.8	18.0	30.4	39.1*
#White Pass(Ea.Side)	21C28	4500	3/30	82	29.9	9.7	21.7	38.5*
#White Pass(Leech L)	21C27	4500	3/30	98	38.2	15.2	26.4	--
Willame Creek	21C30	3250	3/25	115	43.7	10.6	30.9	--

+ Snow water equivalent estimated from aerial stadia observations

# Not directly on this drainage

\* Adjusted 1943-57 average



## APPENDIX 9

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1964		: P a s t   R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content: (In.)	Water Content (In.)	1943-57 Avg.

P U G E T   S O U N D   D R A I N A G ENISQUALLY RIVER

Ghost Forest	21C4	4550	3/27	170	67.8	21.3	47.3	53.3*
Longmire	21C3	2760	3/27	66	23.8	2.2	7.2	14.9*
Paradise Park	21C2	5500	3/27	243	106.8	46.8	71.3	86.4*
Stem Glade	21C1	5050	3/27	218	93.6	45.4	67.6	80.3*

WHITE RIVER

#Cayuse Pass	21C6	5300	3/31	241	113.4	54.2	78.0	97.5
Corral Pass	21C13	6000	3/26	142	52.5	22.1	38.7	47.3*
#Morse Lake	21C17	5400	3/27	160	64.3	32.6	51.0	65.6*
White R. Entrance	21C5	3600	3/31	58	23.0	6.1	12.8	23.2
White R. Entr. New	21C16	3400	3/31	26	9.7	3.5	5.3	11.8*

GREEN RIVER

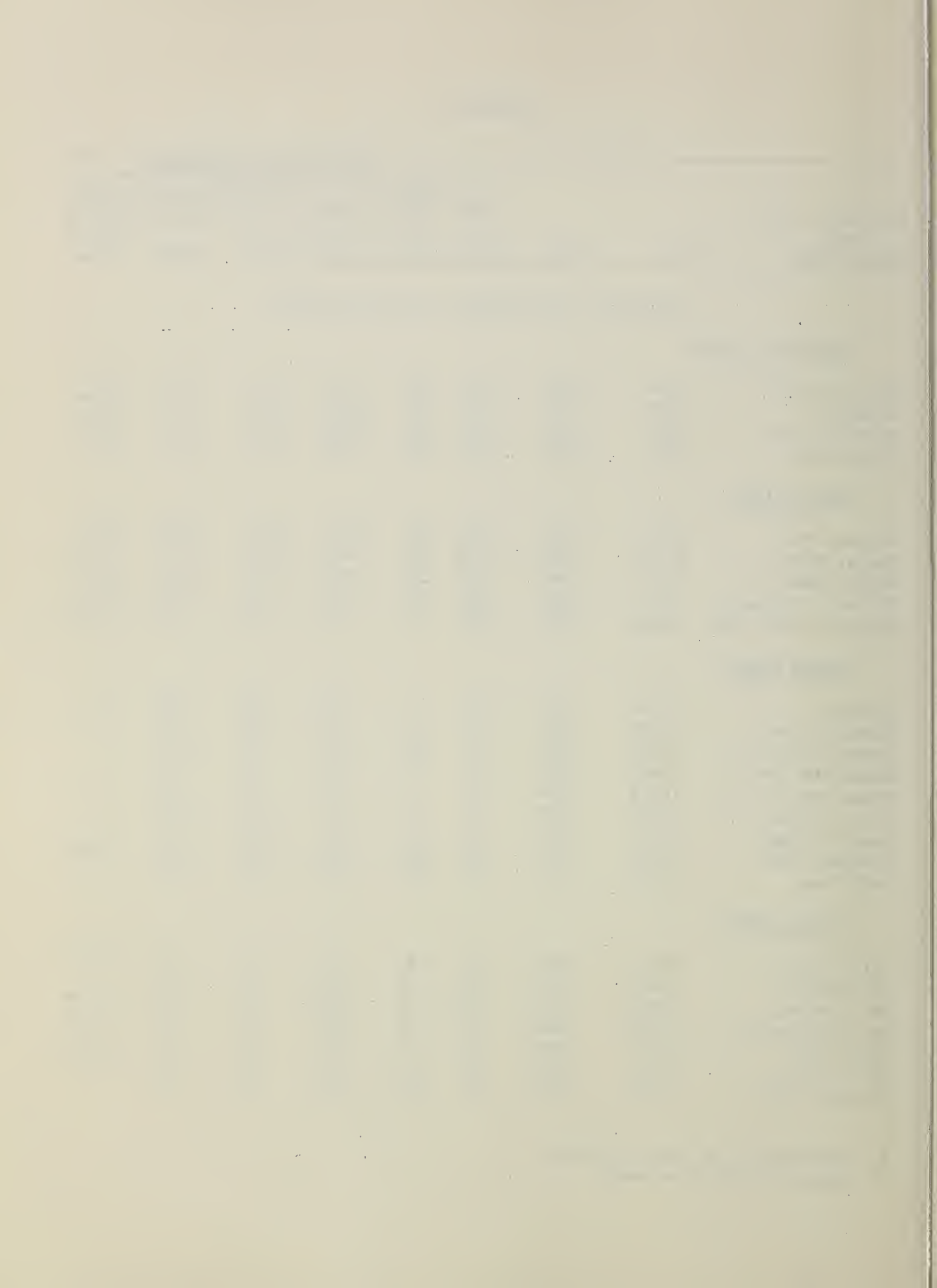
Airstrip	21B24	1800	4/3	11	5.0	0.0	0.0	--
Charley Creek	21B25	1200	4/3	0	0.0	0.0	0.0	--
Grass Mtn. No. 1	21B26	4000	4/3	108	45.3	9.2	23.7	--
Grass Mtn. No. 2	21B27	2900	4/3	90	38.0	6.0	21.0	--
Grass Mtn. No. 3	21B28	2100	4/3	23	9.7	1.0	4.0	--
Lester Creek	21B29	3100	4/3	93	37.6	11.2	25.6	--
Sawmill Ridge	21B31	4700	4/3	132	55.2	22.6	38.4	--
Stampede Pass	21B10	3000	3/31	185	58.3	25.1	38.1	53.8*
Twin Camp	21B30	4100	4/3	100	41.3	13.8	25.8	--

CEDAR RIVER

City Cabin	21B3	2390	4/1	82	37.0	1.4	8.8	27.0*
Mt. Gardner	21B21	3300	3/31	84	37.0	3.1	12.8	--
Mt. Lindsay	21B16	2500	3/30	76	28.0	4.4	12.9	25.8*
Mt. Washington	21B15	3000	3/31	55	26.3	1.8	6.6	9.6*
Rex River	21B17	2400	4/6	81	36.9	3.0	9.4	33.3*
S. F. Cedar	21B6	3000	4/2	95	41.9	2.5	14.2	30.7*
Tinkham Creek	21B20	3400	4/3	108	46.0	3.9	13.4	--

# Not directly on this drainage

\* Adjusted 1943-57 average



## APPENDIX 10

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1964		:P a s t R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content: (In.)	Water Content (In.)	1943-57 Avg.

SNOQUALMIE RIVER

#Lake Elizabeth	21B19	2900	4/5	175	69.2	14.4	47.3	--
Olallie Meadows	21B2	3625	3/30	177	76.8	14.7	41.3	58.6*
S. F. Tolt	21B18	1900	4/4	0	0.0	1.6	0.0	--

SKYKOMISH RIVER

Lake Elizabeth	21B19	2900	4/5	175	69.2	14.4	47.3	--
#Stevens Pass	21B1	4070	3/30	179	78.5	26.2	47.0	54.3*

SKAGIT RIVER

Beaver Creek Trail	21A4	2200	3/25	48	19.3	0.0	7.3	16.3*
Beaver Pass	21A1	3680	3/24	109	41.8	12.2	22.6	38.8*
Devils Park	20A4	5900	3/24	128	52.2	31.8	37.2	45.6*
Freezeout Cr. Tr.	20A1	3500	3/24	44	15.4	3.4	6.7	15.5*
Freezeout Meadows	20A2	5000	3/24	96	34.8	16.1	22.3	36.0*
#Harts Pass	20A5A	6500	3/27	129	51.1	33.4	35.5	48.2*
Klesilkwa	Canada	3700	3/30	54	16.3	1.6	6.5	15.4**
Lake Hozomeen	21A2	2600	3/24	38	13.8	0.6	5.6	13.6*
#Lyman Lake	20A23A	5900	3/29	165	66.2	33.6	40.6	61.3
Meadow Cabins	20A8	1900	3/28	32	11.5	0.0	3.8	8.5*
New Tashme	Canada	2500	3/31	40	15.1	0.5	6.1	10.9**
Quartette Lake	Canada	4000	3/28	57	18.1	9.8	9.5	15.2**
#Rainy Pass	20A9	4780	3/29	127	48.0	25.5	32.9	42.5
Thunder Basin	20A7	4200	3/28	89	31.2	12.9	18.7	28.3*

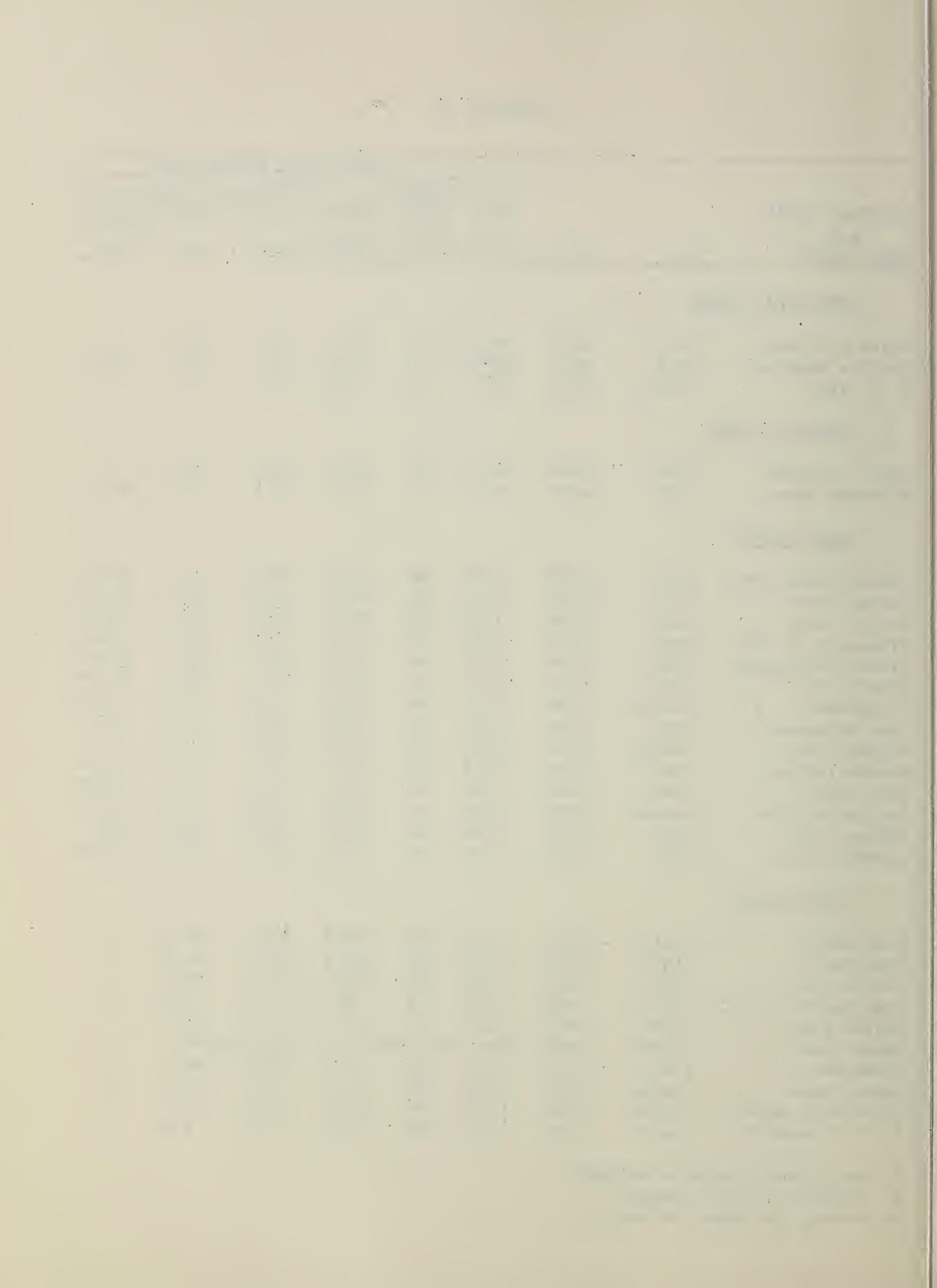
BAKER RIVER

Dock Butte	21A11A	3800	3/29	230	99.7	42.0	63.0	--
Easy Pass	21A7A	5200	3/28	242	106.4	68.7	80.2	--
Jasper Pass	21A6A	5400	3/28	257	108.3	67.3	75.7	--
Koma Kulshan	21A17	800	3/29	18	8.6	0.0	3.2	--
Marten Lake	21A9A	3600	3/29	241	103.3	47.5	62.8	--
Mount Blum +	21A18a	5800	Not Measured		New Course			
#Panorama	21A5	4300	4/1	218	79.0	58.0	66.8	--
Rocky Creek	21A12A	2100	3/29	98	41.7	5.3	19.5	--
Schreibers Meadow	21A10A	3400	3/29	195	84.6	37.4	55.6	--
S. F. Thunder Cr.	21A14A	2200	3/28	38	16.1	0.9	1.8	--

# Not directly on this drainage

\* Adjusted 1943-57 average

\*\* Average for years of record



## APPENDIX 11

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			Date of Survey	1964 Snow Depth (In.)	Water Content: (In.)	: P a s t   R e c o r d		
						Water Content (In.)	1943-57 Avg.	
						:1963	1962	

BAKER RIVER (Cont'd)

Sulphur Creek	21A13	1600	3/29	56	23.1	1.0	10.4	--
Three Mile Creek	21A15	1600	3/27	19	7.4	0.0	0.0	--
Watson Lakes	21A8A	4500	3/29	205	86.6	40.0	58.7	--

NOOKSACK RIVER

Panorama	21A5	4300	4/1	218	79.0	58.0	66.8	--
----------	------	------	-----	-----	------	------	------	----

O L Y M P I C   P E N I N S U L ADUNGENESS RIVER

Deer Park	23B4	5200	3/24	89	28.6	12.7	18.7	31.2*
-----------	------	------	------	----	------	------	------	-------

MORSE CREEK

14 Mile Post	23B11		3/24	32	6.9	New Course		
Morse Creek	23B12		3/22	153	39.1	New Course		

ELWHA RIVER

Hurricane	23B3	4500	3/22	106	37.2	9.1	21.6	35.9*
-----------	------	------	------	-----	------	-----	------	-------

SKOKOMISH RIVER

Black & White	23B7	4200	3/30	144	61.2	16.1	35.2	59.0*
Black & White Lakes	23B6	4700	3/30	160	75.8	27.1	53.6	77.6*
Four Stream	23B10	3000	3/30	88	36.0	New Course		
Home Sweet Home	23B5	5200	3/30	217	96.2	48.1	61.2	94.6*
Sundown Pass	23B8	3900	Not Measured			17.9	43.7	--

\* Adjusted 1943-57 average



# Agencies Assisting with Snow Surveys

## GOVERNMENT AGENCIES

### Canada:

Department of Lands, Forests and Water Resources,  
Water Resources Service, British Columbia

### States:

Washington State Department of Conservation  
Washington State Department of Natural Resources

### Federal:

Department of the Army  
Corps of Engineers  
U. S. Department of Agriculture  
Forest Service  
U. S. Department of Commerce  
Weather Bureau  
U. S. Department of the Interior  
Bonneville Power Administration  
Bureau of Reclamation  
Geological Survey  
National Park Service

## PUBLIC AND PRIVATE UTILITIES

Chelan County P.U.D.  
Pacific Power and Light Company  
Puget Sound Power and Light Company  
Washington Water Power Company

## OTHER PUBLIC AGENCIES

Okanogan Irrigation District

## MUNICIPALITIES

City of Walla Walla  
City of Tacoma  
City of Seattle

*Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.*

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generation, navigation,  
mining and industry

*"The Conservation of Water begins  
with the Snow Survey"*